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HEALTH AND SAFETY PLAN REMEDIAL INVESTIGATION (RI)/FEASIBILITY STUDY (FS)

> MCINTOSH PLANT SITE **OLIN CORPORATION** MCINTOSH, ALABAMA

> > for:

Olin Chemicals Charleston, Tennessee

May 1991





3 4 00598 **TABLE OF CONTENTS**

Section			Page	
1.0	Project	Identification	1	
2.0	Introduction			
	2.1	Purpose and Scope	2	
3.0	Project	Description	3	
4.0	Work A	Activities		
5.0	Responsible Personnel and Training			
	5.1	5.1 PRP Project Coordinator		
	5.2	Project Manager	7	
	5.3	WCC Site Safety Officer	8	
	5.4	WCC Project Health and Safety Officer	9	
6.0	Health	Health and Safety Hazard Assessment		
	6.1	General Hazards	10	
		6.1.1 Physical Hazards	10	
		6.1.2 Biological Hazards	11	
		6.1.3 Chemical Hazards	13	
7.0	General Health and Safety Requirements			
	7.1	Work Zones	16	
	7.2	Personal Protection Equipment (PPE) Provided and Required		
	7.3	Personnel Decontamination		
	7.4	Medical Examination		
	7.5	Compliance Agreement		
	7.6	Project Manager Notification		
	7.7	Prohibitions		
8.0	Air Quality Monitoring			
	8.1	Ambient or Area Monitoring		
		8.1.1 Purpose and Scope	22	
		8.1.2 Organic Vapor Monitoring During Well Sampling		
		Activities	22	

3 4 00599

TABLE OF CONTENTS (Continued)

Section	<u>on</u>			Page
		8.1.3	Mercury Vapor Monitoring During Sediment	
			Sampling Activities	24
		8.1.4	Frequency and Location	24
	8.2	Persor	nnel Exposure Monitoring	25
		8.2.1	Purpose and Scope	25
		8.2.2	Procedure	25
	8.3	Respo	onsibility/Authority	26
9.0	Personal Protective Equipment		26	
	9.1	Head Protection		26
	9.2	Eye Protection		
	9.3	Skin Protection		27
	9.4	Respiratory Protection		27
	9.5	Foot Protection		28
	9.6	Hearing Protection		28
10.0	Laboratory Considerations		28	
	10.1	Analyt	tical Laboratory	28
11.0	Emer	Emergencies/Accidents		29
12.0	Emer	,		30
13.0	Perso	sonnel Assignments		34
	13.1	Projec	et Personnel	34
	13.2	Projec	ct Safety Personnel	34
14.0	•		35	
15.0	Safety Plan Compliance Agreement		36	

3 4 00600

TABLE OF CONTENTS (Continued)

LIST OF TABLES

Table 1 Contaminants Potentially Present in Soils, Sediments or Water

Table 2 Air Monitoring Action Levels for Suspected Airborne Contaminants

LIST OF FIGURES

Figure 1 Site Location Map

Figure 2 Facility Layout

Figure 3 Route to Springhill Hospital

LIST OF APPENDICES

Appendix A Olin Corporation - Policy and Procedure Bulletin 3.0 Plant Safety and

First Aid

Appendix B Heat Stress Casualty Prevention Plan

Appendix C Material Safety Data Sheets

LIST OF ATTACHMENTS

Attachment 1 Site Safety Meeting Report Form

Attachment 2 Site Safety Officer Pre-Work Checklist

Attachment 3 WCC Health and Safety Incident Report Form

Attachment 4 List of Emergency Services and Route (Verbal) to Springhill Hospital

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1.0 **PROJECT IDENTIFICATION**

Project Name:

Olin Corporation

McIntosh, Alabama

Project Number:

90B449C

Business Unit:

Baton Rouge

Project Manager:

William A. Beal

Date of Issue:

December 15, 1990

Effective Dates:

June 1, 1991 - June 1, 1992

Expiration Date of the Plan:

June 2, 1992

2.0 INTRODUCTION

This Health and Safety Plan (HSP) presents health and safety requirements and guidelines for performance of the field related activities of the Remedial Investigation/Feasibility Study (RI/FS) at the Olin Chemicals McIntosh plant site in McIntosh, Alabama. The referenced work activities are described in Section 4.0. Additional work under the direction of WCC which is not described in Section 4.0 may require addenda to this plan.

This plan is prepared for exclusive use of WCC employees, WCC subcontractors, Olin employees and Olin subcontractors for this project as defined by the work activities in Section 4.0. WCC liability is extended to WCC employees and WCC subcontractors only.

Since the Olin facility is an active site, any employees performing RI/FS activities in the active areas of the site shall comply with all Olin policies and procedures. This plan shall not be used for work other than described in Section 4.0 or used after the expiration date without written approval of the WCC Project Manager, WCC Project Health and Safety Officer and the WCC Corporate Health and Safety Officer.

All contractors to Olin involved with the McIntosh facility retain responsibility for all health and safety aspects of their operations and are required to coordinate planning and

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implementation of activities with the WCC Project Manager and the WCC Site Safety Officer. The purpose of such coordination will be to minimize hazards to other personnel on site.

The health and safety guidelines and requirements presented are based on a review of available information and an evaluation of potential hazards. This plan outlines the health and safety procedures and equipment required for activities at this site to minimize the potential for exposures of field personnel. This plan may be modified by agreement of the Project Manger, the Baton Rouge Health and Safety Officer (HSO), and the Corporate Health and Safety Officer. (CHSO), in response to additional information obtained regarding the potential hazards to field investigative personnel.

2.1 Purpose and Scope

The objective of the HSP is to provide health and safety requirements to be implemented during the RI/FS field related activities at the McIntosh site.

This HSP has been developed to be utilized in conjunction with the other project work plans (Work Plan and Sample Analysis Plan). These work plans present a description of the overall RI/FS activities and should be referenced as required. This HSP focuses primarily on the safety precautions for the RI/FS field activities which include the following:

- Groundwater Sampling
- Sediment Sampling
- Surface Water Sampling
- Bathymetric Survey
- Vegetative Stress Survey
- Macroinvertebrate Study
- Fish Sampling

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3.0 **PROJECT DESCRIPTION**

Olin Chemicals McIntosh plant is located east-southeast of McIntosh, Washington County, Alabama. The McIntosh plant (the site) covers approximately 1,500 acres and is bounded by the Tombigbee River on the east; Ciba-Geigy plant on the north; land west of U. S. Highway 43 to the west and River Road to the south. A site location map is presented in Figure 1.

The Olin McIntosh plant is an active chemical production facility. Current active facilities at the plant include: a diaphragm cell chlorine and caustic production process area; a caustic concentration process area; a caustic plant salt process area; a hydrazine blending process area, shipping and transport facilities; process water storage, transport and treatment facilities; and support and office areas. Beyond the active production facilities, the Olin property is heavily forested. The basin area is located on the Olin property, adjacent to the Tombigbee River and east of the active plant facilities.

Two operable units (OU-1 and OU-2) have been designated for the facility. Figure 2 is a facility layout map of the Olin McIntosh plant, which shows the boundaries of the two operable units.

Olin operated a mercury cell chlorine-caustic soda plant on a portion of the site from 1952 through December 1982. In 1954, Olin began construction of a pentachloro-nitrobenzene (PCNB) plant on an adjacent portion of the site. The plant was completed and PCNB production was started in 1956. The McIntosh plant was expanded in 1973 to produce trichloroacetonitrile (TCAN) and 5-ethoxy-3-trichloromethyl-1,2,4-thiadiazole (Terrazole). The PCNB, TCAN and Terrazole manufacturing areas were collectively referred to as the Crop Protection Chemicals (CPC) plant. In 1978, Olin constructed a diaphragm cell caustic soda/chlorine plant which is still in operation. The CPC plant and mercury cell plant were shut down in late 1982. The McIntosh plant continues to operate and produce chlorine, caustic soda, sodium hypochlorite, sodium chloride and blends hydrazine.

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The site was placed on the National Priority List (NPL) on September 30, 1984 (49 Federal Register 37070). A Consent Order become effective on May 9, 1990, to perform a Remedial Investigation/Feasibility Study (RI/FS) at the facility. This Health and Safety Plan (HSP) has been developed in partial fulfillment of the work items to be performed under the jurisdiction of the Consent Order and will be used for RI/FS activities and other work directed by Woodward-Clyde Consultants (WCC).

4.0 WORK ACTIVITIES

Sample collection activities will involve various techniques, equipment, and locations. Personnel should be aware of the necessary PPE and hazards associated with the gathering of these samples. Refer to Sample Analysis Plan Section 5.0 for further information regarding sampling equipment and procedures.

<u>Groundwater Sampling</u>: Groundwater samples will be obtained from monitor wells, corrective action wells, and process water wells.

The groundwater elevation will be measured from all 113 monitor wells at the facility. Well evacuation and sampling will be conducted by one of the following methods:

- Submersible pump
- Bailer
- Bladder Pump
- Permanently mounted corrective action or process water well pump.

Groundwater samples will generally be collected by two-man crews (a geologist and a technician).

<u>Bathymetric Surveys</u>: A bathymetric survey will be conducted to map the bottom configuration of the basin. Equipment used includes a boat equipped with an outboard motor, a self recording fathometer and an electronic distance measuring unit. Transects will be developed in both north-south and east-west directions so that sediment sampling

of these transects can be performed. These surveys will be conducted by a minimum three-man crew, two men in the boat and one man on shore.

<u>Sediment Sampling</u>: Sediment samples will be collected from the basin and associated ditches (both surface, grab samples and core samples). For the surface grab samples, equipment will include shovels, trowels and a grab-type surface sampler such as an Ekman, Ponar or Peterson dredge. The core samples will be collected with a vibracoring unit mounted on a 17-foot gas powered barge. Generally a two-man crews will be used to collect surface samples from the ditches where a boat is not required. Sampling from a boat (either grab or core) will require a three-man crew.

<u>Surface Water Sampling</u>: Surface water samples will be collected from the basin and associated ditches. Sampling equipment will include a one liter capacity LaMotte sampler equipped with a Van Dorn type sample. PPE affording skin and eye protection shall be worn. Similar to the sediment sampling, a two-man crew will be used to collect samples from the ditches where a boat is not required. Three-man crews will be required if sampling is collected from a boat.

Macroinvertebrate Sampling: Macroinvertebrate samples will be collected from the basin using procedures similar to those used to collect the grab sediment samples (with an Ekman, Peterson or Ponar dredge from a boat). Dip nets will be used to collect samples along the shoreline. Three-man crews will be required for the grab samples. A minimum two-man crew will be used to collect the dip net samples.

<u>Vegetative Stress Survey</u>: The vegetative stress survey will generally consist of a biologist walking the basin area and examining the vegetation. Although the survey is conducted by one person, the biologist will have to be in visual or radio contact with another worker at all times.

<u>Fish Sampling</u>: Generally the fish sampling will be conducted from a boat using D.C. electro fishing equipment, hoopnets and possibly gillnets. A minimum three-man crew will be used for the fish sampling.

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5.0 **RESPONSIBLE PERSONNEL AND TRAINING**

The Woodward Clyde Consultants (WCC) Project Director will have overall responsibility for all WCC RI/FS Activities at the site. The WCC Project Manager will oversee day to day RI/FS activities and be responsible for WCC activities. Subcontractors to Olin will be required to furnish a designated Site Supervisor and Site Safety Officer. All site personnel will be required to have documented completion of 40 hours of training specified in 29 CFR 1910.120 for hazardous waste operations and documentation of annual refresher training for the 40-hour training if needed. Additionally, the WCC Health and Safety Officer (HSO) and Site Safety Officer (SSO) will conduct a site-specific health and safety meeting prior to commencement of site activities. Documentation of three days of site supervised training (as per 29 CFR 1910.120) will be required for all personnel.

The WCC SSO will be required to have current certification in standard first aid and CPR. Onsite management and supervisors directly responsible for, or who supervise employees in hazardous waste operations will be required to have completed and documented an addition eight hours of specialized training on managing such operations prior to commencement of site activities. In the event that respiratory equipment becomes necessary, documentation with respect to personal respiratory fit test records and training in the selection, use and limitations of respirators as required by 29CFR 1910.134 will be required and provided to the WCC HSO. Appendix A entitled "Olin Corporation McIntosh Plant Policy and Procedure Bulletin 3.0 Plant Safety and First Aid" shall be read and adhered to by all WCC personnel, WCC subcontractors, Olin employees and Olin subcontractors. Prior to commencement of work activities Olin's contractor coordinator will hold a mandatory pre-job safety orientation for all contractor personnel.

Site specific training will address:

- General site safety (slips, trips, falls)
- Description of site activities
- Required personal protection equipment (PPE)

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- Decontamination
- Work zone procedures
- Air monitoring procedures
- Emergency procedures

A short morning meeting will be held daily by the SSO to address hazards associated with the day's planned activities. The meeting will be documented on a form similar to Attachment 1. The site safety officer will review a pre-work checklist (Attachment 2) daily or as often as necessary.

5.1 Project Director: Dhamo S. Dhamotharan - (504) 751-1873

The Project Director will verify compliance with all aspects of the Consent Order, the appropriate HSP, and all applicable federal and state regulations. The Project Director will verify that all Site Managers report any health and safety incidents to him immediately and that action is taken to correct the causes of the incidents. The Project Director has the authority to temporarily suspend field activities, if health and safety of personnel are endangered, pending an evaluation by the appropriate health and safety personnel.

5.2 Project Manager: William A. Beal - (504) 751-1873

The Project Manager will be responsible for the oversight of all RI/FS activities. He will oversee the day to day RI/FS activities and will coordinate the sampling efforts and subsequent FS activities.

Responsibilities

- Assure that their projects are performed in a manner consistent with the WCC health and safety program.
- Assure that project health and safety plans are prepared, approved, and properly implemented.

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- Provide the HSO with the information needed to develop health and safety plans.
- Implement health and safety plans.
- Assure that adequate funds are allocated to fully implement project health and safety plans.
- Assure compliance with health and safety plans of contractor personnel.
- Coordinate with the HSO on health and safety matters.

Authority (Safety Related)

- Assign HSO approved SSO to project and, if necessary, assign a suitably qualified replacement.
- Temporarily suspend field activities, if health and safety of personnel are endangered, pending an evaluation by the HSO and/or CHSO.
- Temporarily suspend an individual from field activities for infractions of the health and safety plan, pending an evaluation by the HSO, CHSO.

5.3 WCC Site Safety Officer: To be assigned prior to commencement of onsite activities.

The designated WCC Site Safety Officer (SSO) will consist of one member of the RI/FS field site characterization team and will be designated prior to initiating each phase of field work. The SSO will be onsite during RI/FS sampling activities in contaminated zones to monitor and audit health, safety, decontamination and environmental monitoring activities. The WCC Site Safety Officer has the authority to take the following actions:

- To temporarily suspend field activities, if health and safety of personnel are endangered, pending further consideration by HSO and/or CHSO.
- To temporarily suspend an individual from field activities for infractions of the health and safety plan, pending further consideration by the HSO and/or CHSO.

WCC Project Health and Safety Officer: Mr. F. Robert Siener - (504) 751-1873

Mr. Siener will be responsible for designating the SSO and providing any specific training to the SSO such that he may perform his health and safety related duties. The Project Health and Safety Officer may make site visits periodically to oversee the SSO when deemed necessary. In addition, the Project HSO will perform the following functions:

- Maintain the project file of all known health and safety inspections and written notices to contractors.
- Review copies of all initial and subsequent accident or injury reports;
- Provide technical assistance to field safety personnel.
- Review documentation of onsite safety meeting and perform additional safety meetings as required.
- Review and approve changes to the HSP.

6.0 HEALTH AND SAFETY HAZARD ASSESSMENT

The activities discussed in this section reflect that certain work elements will involve some contact with potentially contaminated wastes. The following hazards have been identified and will be protected against:

- Physical Hazards
 - Heat Stress
- Biological Hazards
 - Mosquitoes, gnats, horseflies
 - Fire ants
 - Snakes
 - Poison ivy/poison oak

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Chemical Hazards

- Inhalation of low concentrations of organic vapors
- Skin and eye contact with organic contaminants
- Ingestion of organic contaminants

6.1 General Hazards

6.1.1 Physical Hazards

There is a risk of physical injury resulting from misuse of the heavy equipment at the site. Use of steel toe and shank boots will be required when using or in the vicinity of heavy equipment and whenever the potential for sharp objects to penetrate the feet exists. Working around such sharp objects would require the use of steel toe and shank boots. Personnel should be cognizant of the fact that when protective equipment such as respirators, gloves, and protective clothing are worn while using heavy equipment, visibility, hearing, and manual dexterity are impaired.

Noise hazards may also be present. Personnel exposed to noise levels in excess of permissible noise exposures as defined by 29 CFR 1910.95 shall be protected. Where feasible, administrative or engineering controls shall be utilized. If control measures are not effective or until controls are implemented, personnel shall wear approved personal protective equipment in the form of ear plugs or muffs.

Personnel who are exposed to a time weighted average of greater than 85 dBA shall be required to participate in a hearing conservation program as defined by 29 CFR 1910.95. Noise levels which preclude normal conversation are likely to exceed 85 dBA and therefore require hearing protection.

Boat Safety: Appropriate boat safety must be adhered to including use of a life jacket. If there is a strong current or other marine vessels in the immediate area of work a life line will also be required. Boats should be equipped with a fire extinguisher approved for marine use or UL listed. Should lightning or inclement weather occur, the situation should be assessed before work activities resume. The buddy system shall be utilized.

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Also, the use of personal protective equipment such as protective suits and boots require greater caution when working from a boat. Personnel should evaluate work tasks and maneuvers to prevent slips, trips and falls.

Heat Stress: The use of protective clothing in conjunction with environmental conditions and work load can potentially lead to heat related incidents. Site personnel should be able to identify heat stress victims and be knowledgeable of the first aid treatment procedures. Personnel should replace water and salts lost from sweating before they feel thirsty, since thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement. Drink ample amounts of commercially available liquids, such as GatoradeTM, QuickickTM or etc. Use early morning hours for the majority of physically demanding work. Take breaks in cool rest areas, removing protective garments. Consumption of alcoholic beverages prior to or during heat-related work can promote heat-related illnesses. The importance of acclimation to the South's heat and humidity prior to heat-related work should be stressed, even for employees returning from vacation. Cooling devices, such as vortex tubes or cooling vests, are often used for heat-related work of a long duration. If heat stress becomes a concern, the heat stress casualty prevention plan, attached as Appendix B, shall be implemented by the SSO.

6.1.2 Biological Hazards

Due to the fact that the site is located near a surface waterway, numerous types of pest organisms are present. Mosquitos may be prevalent at the site. Field personnel are encouraged to use insect repellents before venturing onsite. Snakes are also possible. To avoid snake bites, personnel should check for snakes before walking through grassy or debris strewn areas or around ponds or low lying areas. Alligator sitings have been documented at this site. A first aid kit with snake bite kit and insect bite treatment will be available for use at the site.

If stung by an insect and the stinger remains embedded, try to remove the stinger by scraping it away with your finger, credit card or something similar. Do NOT squeeze the stinger, since this will release more venom into the blood. Tweezers can be used to

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removed the stinger. Wash well with soap and water. Put a cold pack on the area that has been stung to reduce swelling and pain. Be sure to place a clean cloth between the skin and the ice to protect the skin. Place the stung area <u>below</u> the level of the heart to slow circulation of the venom.

If the victim exhibits signs of an allergic reaction (i.e., pain, swelling of the throat, redness or discoloration at the site, itching, hives, decreased consciousness), or difficult noisy breathing) call EMS immediately or get the victim to a medical emergency room as soon as possible. While waiting for emergency aid, care for shock and monitor the victim's airway, breathing and circulation.

Shock is the failure of the cardiovascular system to keep adequate blood circulating to the vital organs of the body (such as the brain, heart and lungs). The first hour after a sever injury is the most critical. Signs of shock may include very fast or very slow pulse or breathing, trembling and weakness in arms and legs, cool moist skin, pale or bluish skin, lips, and fingernails, enlarged pupils or confused behavior. For insect or snake bites, (where there is not possibility of head or neck injuries, or leg fractures), place the victim on their back elevating their feet and legs 8 to 12 inches by placing available objects like wood, blankets, etc. under their calves. If the victim vomits, place him or her on one side to avoid blocking the airway with vomitus. Elevation of the legs will no longer be possible. If the victim has trouble breathing place him or her in a semi-reclining position raising the head and back.

In caring for shock, maintain the victim's body temperature. Keep the victim warm enough to keep him or her from chilling. If the victim is outside on a hot day, provide shade from the sun and loosen clothing.

Anyone bitten by a snake should get medical help quickly. If EMS is more than 30 minutes away, transport the victim to medical care in another vehicle if possible. Reassure the victim and keep them calm. Keep the bitten area below the level of the heart. Treat for shock if necessary. Try to remember what the snake looked like so you can tell EMS. Do not apply: a tourniquet or ice pack. Venom is not affected by cold.

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Do not give aspirin since this dilates (widens) the blood vessels, circulating the venom faster.

If attacked by an alligator medical care is imperative! Severe bleeding should be stopped by using direct pressure, elevation and pressure points. Monitor the victim's airway, breathing and circulation. Treat for shock.

Field personnel should always wear chemically resistant boots when working onsite to protect feet and lower leg areas. Poison ivy and poison oak are potential sources to be encountered when clearing brush. Tape long sleeves to work gloves, and tape pant legs to boots. This will provide protection from contacting these plants. If contact with either of these plants is suspected, the affected area should be cleansed immediately with soap and water. Further complications, such as development of a rash/blister formation, fever, etc. may require medical attention. Fire ant mounds may be present at the site. Field personnel should look for fire ant mounds to avoid stepping into one.

6.1.3 Chemical Hazards

Previous investigations have been conducted to define the groundwater contamination at the site. Constituents found in the groundwater include: mercury, chloroform, chlorobenzene dichlorobenzene, and benzene. Contaminants were also detected in the sediments and surface water of the basin during an investigation conducted in 1987 (Olin, 1988). The dominant constituents detected in the sediments were mercury at a maximum concentration of 60.5 mg/kg and hexachlorobenzene at a maximum concentration of 114 mg/kg. Mercury was detected in the surface water at a maximum concentration of 20 μ g/l. Organics were not detected in the surface water.

Based on the RI/FS sample collection activities and the relatively low concentrations of the aforementioned chemicals, substantial air borne concentrations of these chemicals are not likely to be encountered. Therefore, modified level D protection will be recommended initially. If air monitoring instruments indicate airborne concentrations become elevated then the level of respiratory protection will be upgraded as deemed

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necessary by the SSO. The potential for dermal hazards is probable, therefore, efforts to protect the skin will be implemented.

Table 1 lists hazard information summarized for chemicals most likely to be encountered during the work activities. In addition, material safety data sheets for these compounds are included as Appendix C.

There are four routes of exposure to be considered: ingestion, skin absorption, eye contact and inhalation.

Ingestion of chemical hazards will be controlled by prohibiting any eating, smoking, or drinking in the work zone around the sampling areas and by requiring all field personnel to decontaminate themselves upon leaving the site.

Since some of the chemicals involved can be irritating to mucus membranes and absorbed by skin contact, use of protective eyewear, chemically resistant gloves and clothing should eliminate such exposure. Skin and eye contact with chemical hazards can cause serious burns, rashes or irritations. In addition, skin contact may increase internal body exposure through absorption. If a person experiences any skin or eye irritation symptoms, they should report to the SSO for immediate attention. Steps should be taken by the SSO to eliminate similar exposure.

Although inhalation of these chemicals is not expected to be a problem, NIOSH approved half-face or full-face air purifying respirators with organic vapor cartridges should be available in case any volatile organic compounds are encountered.

Substances listed in Table 1 indicate allowable exposure limits for inhalation. These limits are intended as guidelines and should not be construed as fine lines between safe and unsafe conditions. Efforts will be made to keep concentrations as low as possible. These guidelines are concentrations of contaminants that most workers can be exposed to for a 40-hour work week on a permanent basis without significant health effects.

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The Permissible Exposure Limit (PEL) represents the standards promulgated by the Occupational Safety and Health Administration. The PEL's may be promulgated for 8-hour time weighted averages (TWA) or short-term exposure limits (STEL).

A ceiling limit is that concentration which shall not be exceeded during any part of the work day. If instantaneous monitoring is not feasible, then the ceiling shall be assessed as a 15-minute TWA which shall not be exceeded at any time over a working day.

Threshold Limit Values (TLV) are guidelines recommended by the American Conference of Governmental Industrial Hygienists (ACGIH). TLVs may be recommended for TWA or STEL exposures.

Concentrations which are Immediately Dangerous to Life and Health (IDLH) represent the maximum level from which one could escape within 30 minutes without any impairing symptoms or irreversible health effects. IDLHs are not available for most contaminants and are not recommended for chemicals which are potential carcinogens.

Potential hazards may be minimized by protecting against exposures to contaminated soils by utilizing appropriate personal protective equipment. Personal protective equipment to protect the body against contact with known or anticipated chemical hazards has been divided into four categories by the EPA (i.e., Level A, B, C and D) according to the degree of protection afforded.

Level C protection is selected when the types of airborne substance(s) is known, the concentration(s) is measured and the criteria for using air purifying respirators are met. Level C protective equipment includes:

- Full-face, air purifying, respirator-equipped with (organic vapor/HEPA/pesticide/mercury) cartridges (MSHA/NIOSH approved).
- Chemical-resistant clothing with hood; disposable Tyvek or Olin approved equal or non disposable butyl or PVC.

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- Gloves (outer), chemical-resistant; Edmont Snorkle or equal in butyl or neoprene.
- Gloves (inner), chemical-resistant; latex, PVC or equal.
- Boots, chemical-resistant steel toed; butyl or PVC.
- 2-way, intrinsically-safe radio.
- Hardhats.
- Safety glasses with side shields.
- Chemical safety goggles shall be immediately available.

Modified Level D provides for dermal protection, but no respiratory protection.

- Chemical-resistant clothing; Tyvek or Olin approved equal or nondisposable butyl or PVC.
- Gloves, chemical-resistant; Edmont Snorkle or equal in butyl or neoprene.
- Gloves (inner), chemical-resistant; latex, PVC or equal.
- Boots, chemical-resistant, steel-toed, butyl or PVC.
- Safety glasses with side shields.
- Chemical safety goggles shall be immediately available.
- Hard hat.

The protection levels which have been selected are based on the hazard assessment (Section 6.0) and may be revised based on field measurements during RI/FS Activities.

All field activities at the site will require modified Level D protection. Polycoated tyvek suits shall be available in case the SSO deems use of such clothing necessary.

7.0 GENERAL HEALTH AND SAFETY REQUIREMENTS

7.1 Work Zones

For activities conducted under Modified Level D, work zones are not necessary. However, provisions must be made to restrict unauthorized entry into the work areas.

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The designated level of protection (e.g., Level C) will be determined by air monitoring, which is described in Section 8.0. Although grossly contaminated soils are not expected to be encountered, the SSO will make provisions for a personnel decontamination area. This area shall be so designed with entry and exit points clearly marked. For Level C work, distinct work zones are necessary and shall conform to the following guidelines to minimize the movement of contaminants from the site to uncontaminated areas. The three work zones include the following:

Zone 1: Exclusion Zone

Zone 2: Contamination Reduction Zone (CRZ)

Zone 3: Support Zone

Observations by the site safety officer will determine the extent of the zones. Zones shall be established to restrict entry and limit contamination. The exclusion zone is the zone where contamination does or could occur. All persons entering this zone must wear, at a minimum, the level of protection set forth in Section 7.0.

Between the exclusion zone and support zone is the personnel contamination reduction zone (CRZ) which provides a transition zone between the contaminated and clean areas of the site. A preliminary CRZ zone will be located directly outside of each internal exclusion zone and will be defined as a 10-foot zone directly outside the exclusion zone. A complete CRZ zone will be established outside of the total site exclusion zone. A preliminary boot wash will be established at the exit of each internal exclusion zone and a complete decontamination station will be established at the exit of the total site exclusion zone.

The support zone will be an uncontaminated area from which operations will be directed. It is essential that contamination from the site be kept out of this area. Included in this area will be a storage area for decontaminated clothing, additional personal protective equipment, etc.

7.2 Personal Protection Equipment (PPE) Provided and Required 4 00618

All personnel engaged in sampling and mobilization activities at the site will be provided with the following basic personnel protection equipment (PPE).

Mobilization - Level D Protection

- Boots, steel toe and shank
- Hard hat
- Safety glasses with side shields
- Chemical splash goggles (will be immediately available)
- Chlorine escape respirator as required by Olin

Sample Collection - Modified Level D for dermal protection

- Boots chemically resistant, steel-toed
- Hard hats
- Safety glasses with side shields
- Nitrile gloves (outer) latex gloves (inner)
- Chlorine escape respirator as required by Olin
- Coveralls Tyvek or polycoated tyvek suits
- Ear plugs or muffs
- Chemical splash goggles (will be immediately available)

<u>PPE Required</u> Personnel shall wear the first six items listed above at all times except in designated locations. Additional PPE shall be worn when instructed by the SSO.

Olin Prohibitions:

- Sleeveless shirts
- Contact lenses in plant operating areas
- Shorts or cutoffs
- Tennis shoes, sandals or other non-protective shoes

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No cameras unless approved by plant manager

In addition to the PPE listed in this section, additional equipment will be available for use: first aid kit, fire extinguisher and MSHA/NIOSH approved full-face air purifying respirator with organic vapor/HEPA/mercury vapor cartridges and a portable eye wash.

When gathering samples over bodies of water additional PPE is required:

- Life jacket
- Life line

Boats shall be equipped with UL listed fire extinguishers.

The protection level which has been selected is based on the hazard assessment (Section 6.0) and may be revised at a later date with the evaluation of additional data. If the breathing zone air monitoring action levels established for modified Level D operations are exceeded, WCC personnel will upgrade to Level C PPE by donning an approved full-face air purifying respirator with combination organic vapor/HEPA/mercury vapor filter cartridges. Upgrading to Level C will also required the establishment of work zones. Air monitoring is discussed in Section 8.0. WCC personnel will continue to work in Level C PPE until direct reading instruments indicate that breathing zone concentrations are maintained below the modified Level D action levels.

7.3 Personnel Decontamination

Decontamination of personnel will be performed at a designated location at the perimeter of the work areas. If level C work is necessary, then preliminary decontamination at the exit of each internal exclusion zone will consist primarily of soap and water washings and water rinse of chemical resistant boots, followed by a repeat of this activity at the complete decontamination station established at the exit of the total site exclusion zone. Additional activities at the complete decontamination station will

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include soap and water washings and water rinsing of gloves and hands, doffing of PPE, and subsequent decontamination of respirators.

Coveralls should be removed by turning the clothing inside out. A general sequence of doffing procedures is outlined below. The extent of washing required, or modifications to the sequence, may be specified as appropriate.

Steps in decontamination will be as follows:

- Wash work boots and gloves
- Remove outer protective clothing
- Rinse respirator (if applicable)
- Wash hands and face

Contaminated disposable PPE and all decontamination fluids shall be containerized onsite for subsequent disposal by the direction of Olin.

7.4 Medical Examination

Before commencing any of the field activities defined in Section 4.0, all WCC personnel and WCC subcontractors must have taken an annual WCC-approved medical examination as part of WCC's medical surveillance program and provided such examination documentation to the WCC SSO.

Medical monitoring is required for all WCC personnel and subcontractors, Olin personnel and subcontractors involved in the actual sampling activities and/or entering into the exclusion zone. Since kidney damage has been observed in humans exposed to mercury, a baseline urinalysis may be required and followed up annually if the SSO deems such testing is necessary. Urinalysis should include as a minimum, specific gravity, albumin, glucose and a microscopic of centrifuged sediment.

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7.5 Compliance Agreement

The Project Manager and the Baton Rouge Health and Safety Officer shall hold meetings with all WCC field personnel and subcontractor personnel before work commences. During the meeting, all personnel shall be provided with a copy of this health and safety plan; the plan shall be reviewed and discussed and questions answered. Signed Compliance Agreement Forms shall be collected by the Project Manager and filed by the Baton Rouge Health and Safety Officer. Individuals refusing to sign the form will not be allowed to work on the site.

7.6 Project Manager Notification

All field personnel must inform the Project Manager or his designated representative before entering the site. The "buddy system" will be employed during all project work. This means that at least two members of the field crew must be on site whenever work is performed. Personnel must be in visual contact with each other or carry two-way radios at all times.

7.7 Prohibitions

- Smoking, eating, drinking, chewing gum or tobacco, storing food or food containers shall not be permitted on the work site. Good personal hygiene should be practiced by field personnel to avoid ingestion of contaminants or spread of contaminated materials.
- Ignition of flammable liquids within, on, or through improvised heating devises or space heaters.
- Approach or entry into areas or spaces where toxic or explosive concentrations of gases or dust may exist without proper equipment available to enable safe entry.
- Conduct of onsite operations without off site back up personnel.

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8.0 **AIR QUALITY MONITORING**

8.1 Ambient or Area Monitoring

WCC will conduct area monitoring only during well sampling activities during sediment surface water sampling and macroinvertebrate sampling. Well sampling will require organic vapor monitoring. Sediment and macroinvertebrate sampling will require mercury vapor monitoring. Any other area monitoring will be at the discretion of the SSO.

8.1.1 Purpose and Scope

WCC will conduct ambient air monitoring for organic vapors initially at each well sample location and periodically during well sampling activities. WCC will conduct mercury vapor monitoring initially and periodically during sediment and macroinvertibrate sampling activities. Area monitoring will serve as a screening mechanism by which recommendations to perform more extensive personnel monitoring and/or upgrading levels of personal protection can be based.

8.1.2 Organic Vapor Monitoring During Well Sampling Activities

• <u>HNu</u> - Since potential contaminants of concern include chlorinated organic compounds, an HNu photoionization analyzer (HNu) with an 11.7eV probe will be used in conjunction with colorimetric detector tubes to assess initial background concentrations of organic vapors, prior to and periodically, during well sampling activities.

The HNu is a direct reading instrument which detects a wide range of airborne organic vapors with the sensitivity to measure in the parts per million range (ppm). Although this instrument is extremely sensitive, it cannot differentiate or qualify its readings into specific species or contaminants. Based on the principle of operation, a photoionization analyzer measures the concentration of trace gases present by ionizing

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(knocking of an electron out of the atom's electron shell) the atom or molecule by means for an intense UV (ultra-violet) light source, i.e., photons. This will only occur if the ionization potential of the molecule in electron volts (eV) is <u>less than</u> the energy of the photons. The source of photons is the UV lamp inside the probe can have energies of 9.5, 10.2, or 11.7 eV depending on the specific probe used. Therefore, gases with ionization potentials less than that of the UV lamp will be ionized and will therefore deflect the needle on the scale thereby indicating a response. Conversely, if gases with ionization potentials ≥ that of the UV lamp will either not be ionized or barely deflect the needle on the scale indicating partial ionization. In conclusion, the response indicated by the deflecting needle on the scale is relative to the ionization potential of the molecules and the probe used.

The HNu is most sensitive to aromatic hydrocarbons, aliphatic amines, and unsaturated chlorinated hydrocarbons. Carbonyl and unsaturated hydrocarbons, sulfides, ammonia, and the heavier paraffins $(C_5 - C_7)$ can also be detected but with a lesser degree of sensitivity. Methane, ethane and other light paraffins are not detected by the HNu.

HNu readings taken with an 11.7 eV probe will be used in conjunction with information about known or suspected contaminants at the site to determine what level of respiratory protection is required.

Unfortunately, unless there is only one known contaminant of concern the needle response is more than likely due to a combination of different chemicals and therefore the HNu becomes a very useful screening tool.

Detector Tubes - As mentioned earlier the HNu cannot identify specific chemicals therefore colorimetric detector tubes specific for benzene will be used in conjunction with the HNu to establish background levels of

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benzene. The tubes change color when exposed to airborne concentrations of the contaminant specified on the tube itself.

The colorimetric detector tubes and the HNu will be used together to initially and periodically assess ambient air quality. The decision to upgrade to Level C will be made by the SSO based on the data provided by these instruments. Table 2 contains the air monitoring action levels that would trigger such an upgrade. The SSO must bear in mind that benzene is of prime concern since it is considered a potential human carcinogen and has a permissible exposure limit i.e., OSHA-PEL of 1 ppm.

Therefore, the SSO will exercise discretion when assessing sustained HNu readings (15 minutes continuous in a person's breathing zone) and may elect to rely primarily on benzene detector tubes.

8.1.3 Mercury Vapor Monitoring During Sediment Sampling Activities

Colorimetric detector tubes with a minimum detection limit of .02 mg/m³ mercury will be used to assess breathing zone air initially and periodically during sediment sampling. Additional sampling will be at the discretion of the SSO.

8.1.4 Frequency and Location

Upon arriving at designated air monitoring locations and prior to intrusive activities, the HNu, benzene detector tubes, or mercury vapor detector tubes will be used initially to determine baseline ambient concentrations if present. Once the baseline concentrations have been established, the SSO will determine if respiratory protection is needed to begin work. Once work has begun, the SSO will periodically monitor workers' breathing zones. Such monitoring will continue throughout the workday with emphasis on breathing zones of workers directly involved with intrusive activities.

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8.2 **Personnel Exposure Monitoring**

8.2.1 Purpose and Scope

The OSHA regulations for Hazardous Waste Workers (29 CFR 1910.120) states in section (h) that, "Those closest to the source of contaminant generation, shall receive personal air monitoring sufficient to characterize employee exposure."

The purpose of personnel monitoring will be to identify, evaluate and control employee exposure during waste related activities. The monitoring strategy will be designed to assess personnel exposures rather than area or fugitive emissions. WCC monitoring is not intended to replace monitoring required by OSHA 29 CFR 1910.120 for protection of contractor employees.

8.2.2 Procedure

As discussed in Section 8.1, the SSO will be monitoring ambient air for the presence of organic vapors at well locations and mercury vapors for the basin activities using the HNu, benzene detector tubes and mercury vapor detector tubes, respectively. If the HNu and benzene detector tubes suggest benzene to be > .5 ppm or if the HNu readings indicate organic vapors in general to be \geq 50 ppm than actual employee or personnel monitoring will be initiated. If the mercury vapor detector tubes indicate that mercury vapors exceed .02 mg/m³ than actual employee or personnel monitoring will be initiated. Personnel monitoring for both organic vapors and mercury vapors will be achieved by the use of badges also known as passive dosimeters. A representative number of employees from each job category will be the subjects for such personnel exposure monitoring and shall be selected by the WCC SSO. These badges are to be worn in the breathing zone for the entire workshift. Vapors enter the badge by positive controlled diffusion and are adsorbed onto a sorbent material located inside the badge. Following the end of the work shift, the SSO will collect the badges and promptly route them to a certified laboratory for subsequent analysis. Badges are not to be reused for subsequent work shifts and should be worn by one individual per badge. The frequency of such monitoring will be the responsibility of the SSO.

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In accordance with OSHA 29 CFR 1910.20 personnel exposure results will be made available to employees either through posting, verbal communication, site safety meetings, or other effective means.

8.3 Responsibility/Authority

The SSO is responsible for implementation of the air monitoring program. The SSO must insure adequate instrumentation availability, proper calibration, proper field measurement techniques, recording of instrument responses in the safety log book and all paper work involved in personnel sampling such as chain-of-custody forms, sample analysis forms, custody of sample media, etc.

When action levels are exceeded, the SSO will communicate the required actions to the WCC project supervisor. In an emergency situation, the SSO may directly initiate an area evacuation.

9.0 PERSONAL PROTECTIVE EQUIPMENT

This section outlines the general usage guidelines for personal protective equipment.

9.1 Head Protection

Hard hats must be worn by all personnel working onsite.

9.2 Eye Protection

Safety glasses with side shields or goggles must be worn by all personnel performing activities at all times. Safety goggles will be carried by all personnel at all times and worn as necessary. During Level C activities, eye protection will be achieved by utilizing a full-face respirator equipped with combination organic vapor/HEPA/pesticide cartridges. If mercury levels indicate respiratory protection is necessary, cartridges specific for mercury shall be used.

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9.3 Skin Protection

Chemically-resistant coveralls and gloves (inner and outer) are required and must be worn by all personnel engaged in waste-related activities at the site. Used disposable items may be re-used after decontamination provided they are not torn or breached and show no signs of fabric contamination. Disposable items will be disposed of in a designated sealable container after each use or when they become worn or punctured. Non-disposable items will be decontaminated after each use and disposed of in a designated sealable container when they become worn or punctured.

9.4 Respiratory Protection

For respiratory protection against possible volatile organics and contaminated dust, full-face air purifying respirators (APR) will be required if the breathing zone air monitoring action levels for modified Level D work are exceeded. (Refer to Table 2 for action levels). Specific cartridges to be available for use with the APRs will be combination/organic vapor/HEPA/pesticide filter cartridges. If dusty conditions arise, HEPA and pesticide cartridges shall be worn with the APR's. If mercury monitoring suggests airborne mercury vapors are present in excess of the action levels cartridges specific for mercury shall be used with the APR's. All personnel must be properly fittested for the specific brand and size respirator to be used. Fit test records shall be provided to the WCC SSO. A respirator which has not been successfully fit-tested to an employee cannot be used by an individual on the project. To ensure a proper fit, no facial hair will be allowed that will interfere with mask-to-face sealing surfaces. The Site Safety Officer will determine if facial hair represents such an interference. Air purifying respirators will only be used if the following conditions are met:

- The oxygen content of the air is greater than 19.5 percent.
- Concentrations of air contaminants are known and monitored.
- The contaminants of concern all have good warning properties (i.e., odor threshold below PEL value).
- The protection factor is adequate and PELs are not exceeded.

- If concentrations of air contaminants exceed IDLH value, personnel must immediately evacuate.
- Cartridges are changed daily or whenever breakthrough occurs, whichever occurs first.
- Each person has been fit-tested for the specific brand and size of respirator used.
- The respirator is MSHA- and/or NIOSH-approved.

*Olin requires that a chlorine escape respirator be carried by anyone working in the plant.

9.5 Foot Protection

Chemically resistant steel-toed boots will be worn by field personnel engaged in all field activities at the site. Activities over water will require slip resistant shoes.

9.6 Hearing Protection

If work activities preclude the ability to hear normal conversation, then one could assume that the action level of 85 dBA has been exceeded and hearing protection is required.

10.0 LABORATORY CONSIDERATIONS

10.1 Analytical Laboratory

Analysis of all samples will be handled by a contract laboratory. The laboratory director will be informed that the samples may exhibit hazardous levels that would require special handling procedures to prevent risks to the health and safety of laboratory personnel.

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11.0 **EMERGENCIES/ACCIDENTS**

Directions to Springhill Memorial Hospital are as follows:

- Leave site going South on I-43 to I-65 South.
- Take Dauphin Street Exit to the Stop Sign.
- Turn right, go past Dauphin Church and Hospital is on the left.

The telephone numbers and locations of emergency services are given below (also see Attachment 4):

EMERGENCY PHONE LIST

This list of emergency services must either be posted on site or carried by all personnel:

Emergency Service	Location	Telephone Number
Any onsite emergency	Onsite - Olin	Extension 222
Emergency Response	Onsite - Olin	Extension 222
Nurse	Onsite - Olin	Extension 222
Safety	Onsite - Olin	Extension 209
Onsite Ambulance	Onsite - Olin	Extension 222
Security	Onsite - Olin	Extension 260
Fire, Police, Ambulance	Washington County	
	Volunteer	(205) 944-2973
Hospital	Springhill Memorial	(205) 460-5315
Infirmary	Washington County	
	Infirmary Hospital	(205) 847-2223
Emergency Helicopter	South Flight Helicopter	1-800-USA-5151
Haz-Mat Service	Alabama Haz-Mat	
	Response	(205) 438-7230
Poison Control Center	Lafayette, LA	(318) 325-6454
WCC Physician	Baton Rouge, LA	(504) 275-7770
Page 29		

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Illness, injuries, and accidents occurring must be attended to immediately in the following manner:

- Remove the injured or exposed person(s) from immediate danger.
- Render FIRST AID if necessary. Decontaminate affected personnel, if necessary.
- Report the accident to the Health and Safety Officer immediately. Form HS-502 must be completed within 24 hours of any accident and forwarded to the Corporate Health and Safety Officer (see Attachment 3).
- Develop procedures, in accordance with the Health and Safety Officer, Site Safety Officer, and Project Manager to prevent a recurrence.

Illness, injuries, and accidents occurring must be attended to immediately in the following manner:

- Remove the injured or exposed person(s) from immediate danger.
- Render FIRST AID if necessary. Decontaminate affected personnel, if necessary.
- Report the accident to the Health and Safety Officer immediately. Form HS-502 must be completed within 24 hours of any accident and forwarded to the Corporate Health and Safety Officer (see Attachment 4).
- Develop procedures, in accordance with the Health and Safety Officer, Site Safety Officer, and Project Manager to prevent a recurrence.

12.0 EMERGENCY RESPONSE PLAN

The following Emergency Response Plan (ERP) has been developed in conformance to Paragraph (L) of 29 CFR 1910.120. The plan has been divided into the following:

Pre-emergency Planning

Site personnel will be given the local fire, ambulance and hospital phone numbers and locations prior to mobilization and inform them of the work that will be conducted at

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the site and the potential emergency situations that may occur. The Olin Job Supervisor will conduct a mandatory safety orientation for contract employees which will explain emergency evacuation procedures and other safety topics. An emergency phone list is presented on Attachment 4. A diagram presenting the route to the nearest hospital is presented on Figure 3. Olin's Policy and Procedure Bulletin 3.0 "Plant Safety and First Aid" has been included as Appendix B.

At the site, specified health and safety meetings for onsite personnel will be conducted by WCC so WCC employees and WCC subcontractors will be informed of the emergency procedures described in this plan.

Fire/Explosion

Small fires in the work area should be extinguished if personnel safety is not jeopardized. If the fire cannot be safely put out, all site personnel should safely leave the work area and report to the front gate. The site Health and Safety Officer shall immediately notify their respective Project Manager. Site personnel will determine the follow-up response.

Vapor Cloud - Flammable and/or Toxic

In the event of a site condition causing unanticipated vapor emissions from the site, all personnel, should evacuate with their chlorine escape respirator in their immediate possession. Personnel are to evacuate and remain at their pre-assigned evacuation assembly area for a head count and remain until:

- They are notified to return to their respective job sites, via the emergency broadcast system receiver or pager
- The continuous all clear alarm is sounded for one minute
- Wind direction changes or the release continues, dictating the need for further evacuation measures

The Site Safety Officers shall notify the Project Manager of any emergency condition resulting from work.

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In all cases, if a gas release occurs, personnel should leave the work area to report to a designed area, unless the Site Office determines through contact with site personnel that this action is not necessary.

It should be noted, that the chlorine alarm system is activated on the first and third Tuesday of each month at 8:45 a.m. as a test. The plant alarm is tested every Tuesday at 9:00 a.m.

Communication

At the work site, an air horn shall be made available to sound a continuous blast if any emergency has occurred. The following hand signals will be recognized by each site worker:

<u>Signal</u>	Meaning
Grip partner's wrist	Leave area immediately and report to staging area
Hand on top of head	Need assistance
Thumbs up	OK; I'm all right, I understand
Thumbs down	No; Negative
Continuous Blast of Air Horn	Evacuate Work Area Safely

Personnel Response Alarm

In the event of a fire, explosion or chemical release, where evacuation is necessary, all personnel shall evacuate upwind. The SSO assumes command and shall direct team member to call the Fire Department, Sheriffs Department and the HSO. The SSO shall determine if team members can safely initiate control measures. When the Fire Department arrives, the SSO meets them and briefs them on the incident. The Fire

Department assumes control upon arrival. Team members are to remain upwind and follow directives of the Fire Department. Work shall not resume until the Fire Department and the SSO both declare the incident controlled.

Assembly Point

All personnel will be required to sign in and sign out at the site trailer. The front gate will be the assembly point in case of an evacuation. The SSO will conduct a head count to determine whether everyone was able to evacuate safely.

The SSO will document this information in the Field Log Book.

Medical Emergency

If an injury occurs take the following steps:

- Prevent further injury and notify the SSO and the Project Manager.
- Initiate first aid and get medical attention for the injured immediately.
- Depending upon the type and severity of the injury, call a physician.
- Prepare an incident report using the procedures discussed previously.
- The SSO will assume charge during a medical emergency.

If waste comes in contact with the skin, take the following steps:

- Wash skin thoroughly with soap and water.
- Rinse thoroughly with water.
- Observe skin for redness. If redness occurs, seek medical attention.

Spill Control

Equipment and personnel shall be available to perform emergency measures required to contain any spillages and to remove spilled materials and soils or liquids that become contaminated due to spillage. This collected spill material shall be properly disposed.

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This includes spillage during waste excavation and loading, equipment and personnel decontamination.

Equipment and personnel shall also be available to perform decontamination measures that may be required to remove spillage from previously uncontaminated structures, equipment, material, or existing ground. Decontamination residues will be properly disposed.

13.0 PERSONNEL ASSIGNMENTS

13.1 Project Personnel

WCC personnel authorized to work on this project and enter the site are:

Project Manager: William A. Beal
Baton Rouge Safety Officer: Francis R. Siener, Jr.

*
Field Personnel:

13.2 Project Safety Personnel

Personnel responsible for implementing this Safety Plan are the Project Manager and Site Safety Officer. Their specific responsibilities and authorities for all responsible WCC personnel are listed in Section 5.0 of this plan as well as Table 2-1 of the WCC Health and Safety Manual dated November 1990.

^{*}To be assigned prior to commencement of work activities.

14.0 SAFETY PLAN APPROVALS

Francis R. Siener, Jr., CIH

Health and Safety Officer
- Baton Rouge Business Unit

5/54/91 Date

William A. Beal Project Manager Date

Phil Jones, C. I. H.

Corporate Health and Safety Officer

Client

Olin Chemicals

Project:

McIntosh Alabama Plant Site

Project Number:

90B449C

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TABLES

TABLE 1 CONTAMINANTS POTENTIALLY PRESENT IN SOILS, SEDIMENTS OR WATER

Chemical Name	Description	Skin <u>Designation</u>	Exposure Limits	<u>IDLH</u>	Hazards/Effects of Exposure
Benzene	Colorless liquid with aromatic odor		OSHA PEL-TWA - 1 ppm STEL-5 ppm TLV-TWA - 10 ppm IDLH - None recommended Potential Human Carcinogen	Ca*	Acute exposure to high concentration (> 100 ppm may produce an anesthetic effect on the central nervous system. Symptoms include confusion, dizziness, headaches and if exposure continues, coma. Benzene is a potential human carcinogen affecting the blood forming system. Inhalation is the forming system. Inhalation is the primary route of exposure but skin absorption is possible. Chronic symptoms are vague and include fatigue, headache, dizziness and loss of appetite.
Chloroform	Colorless liquid with a pleasant sweet odor		OSHA PEL-TWA - 2 ppm STEL - None established ACGIH TLV-TWA - 10 . ppm IDLH - None recommended Potential Human Carcinogen	Ca*	Initial exposure produces a warm feeling of the face and body then an irritation of the mucus membranes and skin followed by nervous aberration. Prolonged inhalation will bring on paralysis accompanied by cardiac or respiratory failure and finally death. Chloroform is a potential human carcinogen. Inhalation is the primary route of exposure.
1,2,4-Trichlorobenzene Ca* Suspect human carci	Colorless liquid nogen.		OSHA PEL-TWA- None established STEL - None established Ceiling - 5 ppm ACGIH TLV-TWA - None established Ceiling - 5 ppm		paralysis accompanied by cardiac or respiratory failure and finally death. Chloroform is a potential human carcinogen. Inhalation is the primary route of exposure. Toxic by ingestion and inhalation Cy Cy Consultation

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TABLE 1 (Continued)

CONTAMINANTS POTENTIALLY PRESENT IN SOILS, SEDIMENTS OR WATER

	s :E	s, loss oulse.	Sure. Sure.	rd-Clyde Con
Hazards/Effects of Exposure	Can be an inhalation hazard. it has been reported to cause liver injury in humans. An insecticide.	Acute exposures include drowsiness, loss of consciousness, twitching of the extremities, cyanosis, deep, rapid respirations and a weak, irregular pulse. Prolonged exposure may cause kidney and liver damage. Inhalation is the primary route of exposure.	Irritating to skin and mucus membranes. Inhalation is primary route of exposure. OM Poop OM	Oral is primary route of exposure.
H7QI	1,000 ppm	2,400 ppm	1,700 ppm	
Exposure Limits	OSHA PEL-TWA - 75 ppm STEL - None established ACGIH TLV-TWA - 75 ppm IDLH - 1,000 ppm	OSHA PEL-TWA - 75 ppm STEL - None established ACGIH TLV-TWA - 75 ppm IDLH - 2,400 ppm	PEL-TWA · None established · Ceiling · S0 ppm ACGIH TLV-TWA · None established Ceiling · S0 ppm ACGIH TLV-TWA · None established Ceiling · S0 ppm Ceiling · S0 ppm IDLH · 1,700 ppm	OSHA PEL-TWA - None cstablished ACGIH STEL - None cstablished TLV-TWA - None cstablished IDLH - None established
Skin <u>Designation</u>			*	
Description	Colorless solid with a mothball-like odor	Colorless liquid with a mild aromatic odor	Colorless to pale yellow liquid with a pleasant aromatic odor	Crystals
Chemical Name	1,4-Dichlorobenzene	Chlorobenzene	1,2-Dichlorobenzene	Hexachlorobenzene

X* Can affect skin mucous membranes and eyes either by airborne route or direct contact.

TABLE 1 (Continued)

CONTAMINANTS POTENTIALLY PRESENT IN SOILS, SEDIMENTS OR WATER

Chemical Name	Description	Skin <u>Designation</u>	Exposure Limits	<u>IDLH</u>	Hazards/Effects of Exposure
Pentachloronitro- benzene	Coloriess crystals		OSHA PEL-TWA - None established STEL - None established ACGIH TLV-TWA - None established IDLH - None established		Oral primary route of exposure. Dermal is secondary route of exposure. An insecticide and an experimental teratogen.
gamma- hexachlorocyclo-hexane	White crystalline powder		OSHA PEL-TWA - None established STEL - None established ACGIH TLV-TWA - None established IDLH - None established		Toxic organochlorine pesticide which accumulates in mammalian tissue. Acts as a CNS stimulant, i.e., convulsion.
Mercury	Vapor or as a silvery, mobile odorless liquid		OSHA PEL-TWA - 0.5 mg/m³ STEL ACGIH TLV-TWA - 0.6 mg/m³ IDLH - 28 mg/m³		Acute effects include: erosion of the respiratory/GI tracts, nausea, vomiting, bloody diarrhea, shock, headache, metallic taste. Chronic effects include: tremors, emotional problems, los of concentration, fatigue, kidney problems eye lesions, visual disturbances, sore mouth and throat, loss of memory, an etc. Primary routes of exposure are skin absorption and inhalation.
Lead	Appearance and odor vary depending on specific compound		OSHA PEL-TWA - ,05 mg/m³ ACGIH TLV-TWA15 mg/m³ IDLH - None established		Lead is a cumulative poison. Produces a brittleness of red blood cells so that they hemolyze with slight trauma. Target organs include GI tract GNS, kidneys, blood, gingival tissue and etc. Primary route of exposure includes inhalation and ingestion of dusts, fumarists or vapors.

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TABLE 2

AIR MONITORING ACTION LEVELS FOR SUSPECTED AIRBORNE CONTAMINANTS

Contaminant	Instrument	Instrument Reading ¹	Action Taken
Benzene	Detector Tube	>05 ppm²	Continue work in Modified Level D
		>.5 - 50 ppm	Upgrade to Level C Full-Face APR expand work zones, and implement use of organic vapor badges
		>50 ppm	Evacuate area
Organic Vapors	HNu	0 - 50 ppm	Continue work in Modified Level D
	(11.7 probe) or equivalent i.e., organic vapor analyzer (OVA)	>50 - 250 ppm	Upgrade to Level C Full-Face APR expand work zones and implement use of organic vapor badges
Mercury	Detector Tube	Background02 mg/m³	Modified Level D
		>.0225 mg/m ³	Implement Level C Full-Face APR and use of mercury vapor badges or Evacuate
		>.25 - 20 mg/m ³	Evacuate

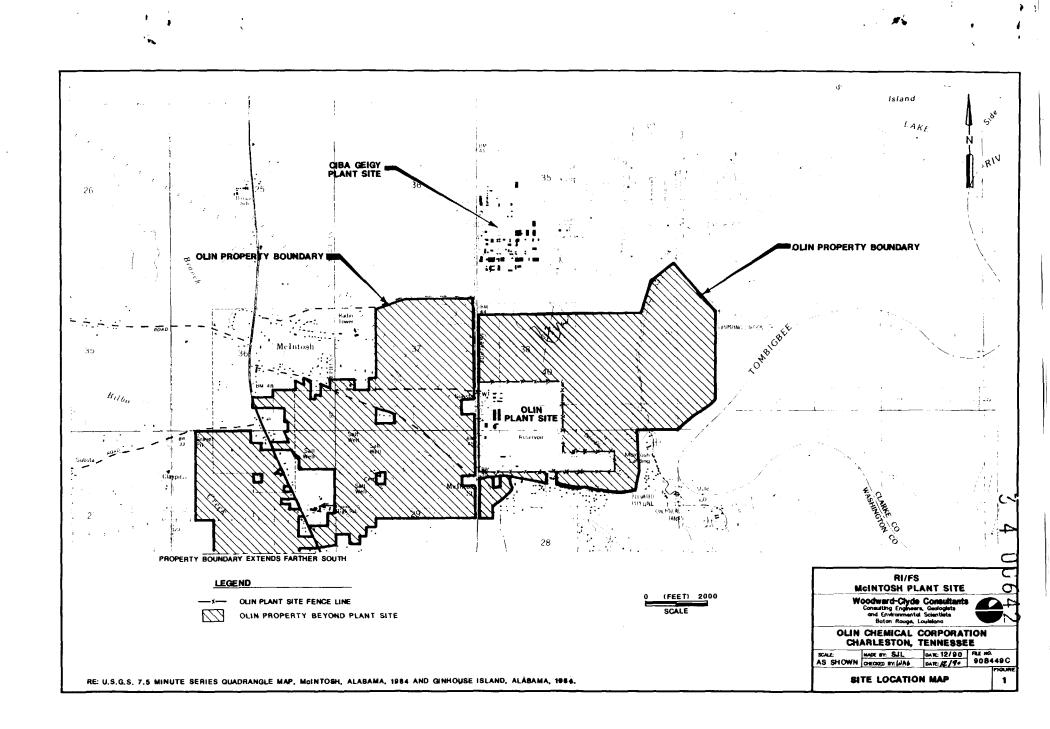
NOTES:

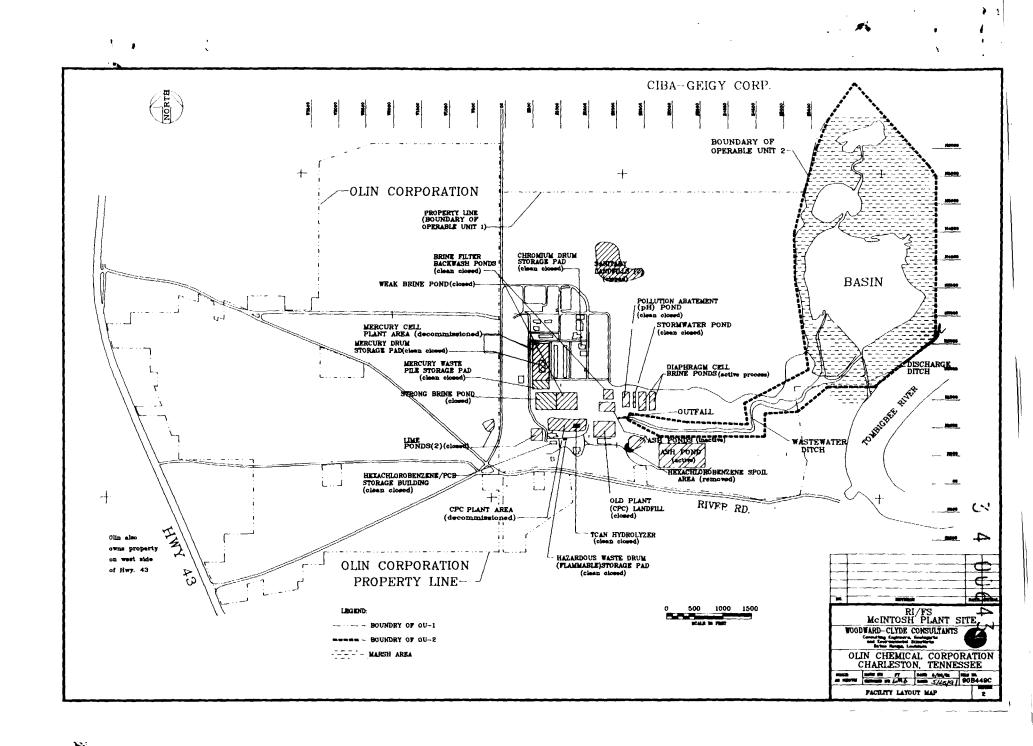
Sustained readings (approximately 15 minutes of consistent readings) in breathing zone, (i.e., 1-foot radius around a person's head).

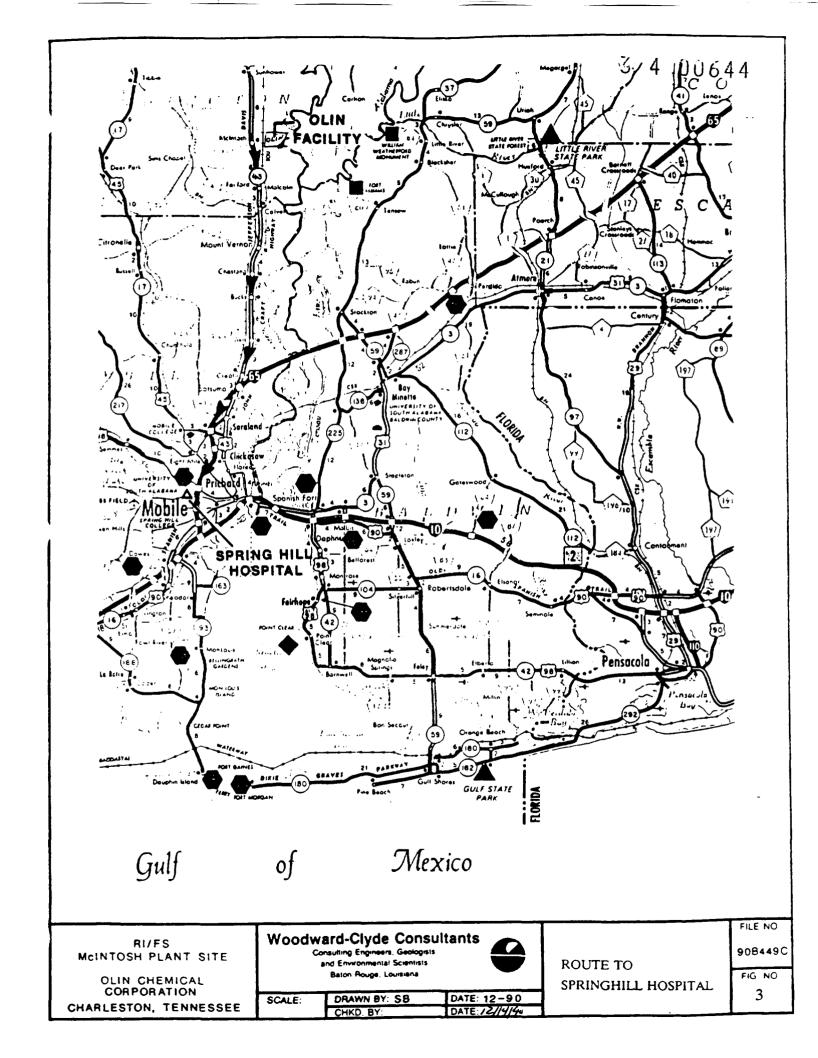
Two consecutive readings taken 15 minutes apart.

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FIGURES







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APPENDIX A HEALTH STRESS CASUALTY PREVENTION PLAN

HEAT STRESS CASUALTY PREVENTION PLAN

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Due to the increase in ambient air temperatures and the effects of protective outer wear decreasing body ventilation, there exists an increase in the potential for injury, specifically, heat casualties. Site personnel will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim and the prevention of heat stress casualties.

A. TYPES OF HEAT STRESS

- Heat stress is the aggregate of environmental and physical work factors that constitute the total heat load imposed on the body. The environmental factors of heat stress are the air temperature, radiant heat exchange, air movement, and water vapor pressure. Physical work contributes to the total heat stress of the job by producing metabolic heat in the body in proportion to the intensity of the work. The amount and type of clothing also affect the heat stress.
- Heat strain is the series of physiological responses to heat stress. When the strain is excessive for the exposed individual, a feeling of discomfort or distress may result, and, finally, a heat disorder may ensue. The severity of strain will depend not only on the magnitude of the prevailing stress, but also on the age, physical fitness, degree of acclimatization, and dehydration of the worker.
- 3) Heat disorder is a general term used to describe one or more of the following heat-related disabilities or illnesses:

o Heat exhaustion

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- o Heat cramps
- o Heat stroke

B. IDENTIFICATION AND TREATMENT

1) Heat Exhaustion

- a) Symptoms: Usually begins with muscular weakness, dizziness, nausea, and staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, his skin is clammy, and he may perspire profusely. The pulse is weak and fast, his breathing is shallow. He may faint unless he lies down. This may pass, but sometimes it remains and death could occur in extreme cases.
 - Decontamination Reduction Zone in a shady or cool area with good air circulation. Remove all protective outer wear. Call a physician. Treat the victim for shock. (Make him lie down, raise his feet 6-12 inches and maintain a normal body temperature (loosen or remove clothing). If the victim is conscious, it may be helpful to give him one-half glassful of water every 15 minutes, as tolerated. Transport victim to a medical facility as soon as possible.

2) <u>Heat Cramps</u>

a) Symptoms: Painful intermittent spasms of the voluntary muscles following hard physical work in a hot environment. Cramps

usually occur after heavy sweating and often begin at the end of a work shift.

b) First Aid: Move the person to a cooler place. Give victim one-half glassful of water every 15 minutes for an hour as tolerated.

3) Heat Stroke

- a) Symptoms: This is the most serious of heat casualties due to the fact that the body excessively overheats. Body temperatures often are between 107° 110° F.: First there is often pain in the head, dizziness, nausea, oppression, and the skin is dry, red and hot. Unconsciousness follows quickly and death is imminent if exposure continues. The attack will usually occur suddenly.
- b) First Aid: Immediately evacuate the victim to a cool and shady area in the Personnel Decontamination Reduction Zone. Remove all protective outer wear and all personal clothing. Lay him on his back with the head and shoulders slightly elevated. It is imperative that the body temperature be lowered immediately. This can be accomplished by applying cold wet towels, ice bags, etc., to the head. Sponge off the bare skin with cool water or even place him in a tub of cool water. The main objective is to cool him without chilling him. Give nothing by mouth. Transport the victim to a medical facility as soon as possible.

C. PREVENTION OF HEAT STRESS

Implement as many of the following control measures as are appropriate to site conditions in controlling neat stress:

- Provide for adequate liquids to replace lost body fluids and replace water and salt lost from sweating. Encourage personnel to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.
- o Replace fluids with water, commercial mixes such as Gatorade or Quick Kick, or a combination of these.
- A work schedule should be established so that the majority of the work day will be during the morning hours of the day before ambient air temperature levels reach their highs.
- o Establish a work regimen that will provide adequate rest periods for cooling down. This may require additional shifts of workers.
- o Wear cooling devices such as vortex tubes or cooling vests beneath protective garments.
- o Take all breaks in a cool rest area (77°F is best).
- o Remove impermeable protective garments during rest periods.
- o Do not assign other tasks to personnel during rest periods.
- o Inform personnel of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.
- 1) In accordance with current NIOSH/OSHA/USCG/EPA recommendations, the following work/rest guideline will be implemented for personnel required to wear Level B or C protection.

For work levels of 250 kilocalories/hour

Adjusted Temperature ^a	Maximum Work Time
90°F (32.2°C) or above	15 minutes
87.5 · -90 · F (30.8 · -32.2 · C)	30 minutes
82.5 -87.5 °F (28.1 °-30.8 °C)	60 minutes
77.5 -82.5 F (25.3 * -28.1 ° C)	90 minutes
72.5 -77.5 °F (22.5 °-25.3 °C)	120 minutes

3 4 00650 using this equation:

"Calculate the adjusted air temperature (ta adj) by using this equation: ta adj "F = ta "F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

A sufficient period will be allowed for personnel to "cool down." This may require shifts of workers during operations.

D. HEAT STRESS MONITORING

For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism. Monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. Frequency of monitoring should increase as the ambient temperature increases or if slow recovery rates are indicated. When temperatures exceed 80 degree Fahrenheit, workers must be monitored for heat stress after every work period.

- Heart rate (HE) should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33%.
- Body temperature should be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99 degree Fahrenheit. If it

does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. However, if the OT exceeds 99.7 degrees Fahrenheit at the beginning of the next period, the following work cycle should be further shortened by 33%. OT should be measured again at the end of the rest period to make sure that it has dropped below 99 degree Fahrenheit.

Body water loss (BWL) due to sweating should be measured by weighing the worker in the morning and in the evening. The clothing worn should be similar at both weighings; preferably the worker should be nude. The scale should be accurate to plus or minus 1/4 lb. BWL should not exceed 1.5% of the total body weight. If it does, workers should be instructed to increase their daily intake of fluids by the weight loss.

Ideally, body fluids should be maintained at a consistent level during the work day. This requires replacement of salt lost in sweat as well. Ideally, loss of body salt is replaced through diet and/or the consumption of commercial preparations such as Gatorade. Quick Kick, or etc.

Good hygienic standards must be maintained by frequent change of clothing and daily showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

APPENDIX B OLIN CORPORATION - POLICY AND PROCEDURE BULLETIN 3.0 PLANT SAFETY AND FIRST AID

McIntosh, AL 2nd Revision September 19, 1988

OLIN CORPORATION MCINTOSH PLANT

POLICY AND PROCEDURE BULLETIN 3.0 PLANT SAFETY AND FIRST AID

3.3 HEALTH HAZARD COMMUNICATION

PURPOSE:

The management of this plant has set forth standards that provide for the employees information about health and safety relative to their work environment. It is our policy to inform employees about potential hazards in the workplace and comply with all applicable federal, state and local laws.

RESPONSIBILITY:

The Safety Manager is responsible for overseeing the plant Hazard Communication Program. This includes the following:

- -Establishing and maintaining an accurate list of the hazardous chemicals used within the plant.
- -Maintaining a program which ensures that material safety data sheets are available to all employees potentially exposed to hazardous chemicals.
- -Establishing a training program in which employees are informed of the hazards associated with chemicals in their work area and the methods available to protect themselves.
- -Making this program available, upon request, to employees, their designated representatives, the Assistant Secretary of Labor for Occupational Safety and Health or designee, or Director, National Institute for Occupational Safety and Health or designee.

PROCEDURE:

Labels And Other Forms Of Warning

The responsible area supervisor will be held accountable for ensuring that in plant containers are appropriately labelled. The Shipping Supervisor is responsible for properly identifying all production shipments. The Laboratory Supervisor is responsible for properly identifying all laboratory shipments. Shipments or in plant storage of hazardous materials will be the area supervisors' responsibility. In plant containers, storage tanks, pipelines, etc. will be labeled, tagged or marked with the identity of the hazardous

3.3 HEALTH HAZARD COMMUNICATIONS

1

PAGE (3)

Employee Information And Training (continued)

During the training sessions, employees will be informed of: (1) the requirements of the standard; (2) any operation in their work areas where hazardous chemicals are present; and (3) the location of this written program. Training will consist of: (1) identifying the health and physical hazards of the chemicals in the work area; (2) discussing methods employees can use to detect the presence or release of hazardous chemicals, as well as a description of monitoring conducted by management; (3) identifying measures employees can take to protect themselves (work practices, ventilation and other engineering controls, personal protective equipment) from these identified health and physical hazards; and (4) explaining the details of the hazard communication program including and explanation of the labeling system, the location of the MSDS files, etc.

Training will consist of a series of video tapes followed by group discussions. The Olin Hazard Communication Training Program/Manual will be used to train employees. This program consists of three levels of training which are outlined below:

Level One training is used to train all Olin employees in the location, is designed to inform everyone of the requirements of OSHA's Hazard Communication Standard. Approximate time - a 1/2 hour.

Level One consists of: Two video tapes -

Introduction to Chemical Safety - Olin HAZCOM Program Material Safety Data Sheet/Toxic Substance Control Act

and the following sections in the manual:

Introduction Olin's "Health Hazard Communications Standard" Sections 1-6

Level Two training is used to train all first-line supervisors who will be training their personnel in the health hazards on the job. This level is designed to instruct first-line supervisors on how to prepare their materials for their HAZCOM meeting. In conjunction with Level One, this will complete the training requirement for first-line supervisors. Approximate time - 2 1/2 hours.

3.3 HEALTH HAZARD COMMUNICATION

PAGE (4)

Level Two Consists of:

Section 7-13 in Training Manual Appendix Section of Manual

Level Three training is used to train all personnel who face possible exposure to hazardous chemicals. It is designed to satisfy the requirements of OSHA's Hazardous Communications Standard 1910.1200. Combined with Level One training, and using materials contained in Level Two, Level Three training will complete the training requirements for potentially exposed individuals. Approximate time, 1 hour

Level Three consists of:

Materials developed in supervisors training Leader's Guide found in Appendix of manual

and the following video tapes:

Unit 2 - Corrosives

Unit 3 - Solvents

Unit 4 - Oxidizers

Unit 5 - Poisons

Unit 6 - Gases

Unit 7 - Explosives

Unit 8 - Carcinogens

These tapes can be used as necessary depending on the type of hazardous chemicals found in the specific location.

Training For Non-Routine Tasks

Prior to performing a "non-routine" job where the employee might possibly be exposed to a new or unfamiliar hazardous chemical, employees involved will meet with their supervisor, review MSDS's of materials which they may come in contact and discuss the personal protective equipment and environmental controls (ventilation) which will be used to prevent excessive exposure. The supervisor will ensure that the employees have been properly trained to use the required PPE, environmental control equipment and are aware of the health and physical hazards associated with the chemicals with which they may come in contact.

3.3 HEALTH HAZARD COMMUNICATION

PAGE (5)

Contractor Training:

Prior to beginning a job, Olin's Contractor Coordinator will hold a Pre-Job Safety Orientation which will include Hazardous Materials. Applicable Material Safety Data Sheets will be distributed at this time. Any other Material Safety Data Sheets that are requested shall be furnished by Olin. It will be the Contractor's responsibility to train their employees prior to starting a job.

Recordkeeping:

The following records will be kept by the program Administrator.

- A. A list of the hazardous chemicals in the facility (MSDS Master copy).
- B. The master MSDS copy for each hazardous chemical.
- C. The letters requesting MSDS from Manufacturers of hazardous chemicals which were received on first shipment.
- D. Attendance lists for the employee training sessions.
- E. The Olin Corporation Hazard Communication Program Manual and Video Tapes.

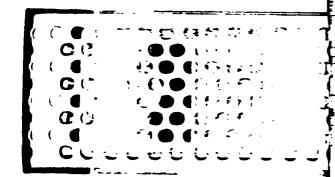
NOTE: THIS POLICY SHALL BE REVISED THREE YEARS FROM THE REVISION DATE.

J. E. Simon

7. Rytlewski

E Champion

W. Berocher



EMERGENCY PHONE NUMBERS

Any Emergency 222
Medical 231/406
Safety 209/450
Security Station 260
Contract Security Station 318

THIS CARD VALID FOR 6 MONTHS FROM DATE ISSUED

WELCOME TO THE OLIN McINTOSH PLANT

SAFETY IS AN INTEGRAL PART OF EVERYTHING WE DO. We expect your visit to be an enjoyable one, and with your asfety in mind, we call your attention to some basics.

- Contractors are not allowed beyond the Contract Security Station until the Olin Job Supervisor has been notified and approves entry.
- 2. The use of the chlorine escape respirator has been explained to you. Feel free to ask any further questions. Glasses with side shields, chemical splash goggles, chlorine escape respirator and hard hat are mandatory personal protective equipment required in the plant.
- The plant has minimum clothing requirements and the following are not allowed:
 - sleeveless shirts
 - contact lenses in plant operating areas
 - shorts or cut offs
 - tennis shoes, sandals, or other non-protective shoes.
- If you are driving, observe all posted traffic signs. Maximum speed limit in the plant is 15 MPH.
- Observe visible signs and markers. Use handrails when ascending or descending stairs.
- 6. The "No Smoking" areas are posted throughout the plant.
- 7. Avoid "curiosity action" in unfamiliar surroundings.
- No cameras allowed on plant site without plant manager's approval.
- The Olin Job Supervisor is responsible for conducting a safety orientation for all contract employees.

Olin - McIntosh Plant



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OUTSIDE CONTRACTOR COMPANY

SAFETY ORIENTATION BY SUPERVISORS

S.O.S. is a guide for the Department Supervisor to use in SAFETY orientation of New Employees, Outside Contractors and Visitors. It is not all inclusive and Topics may be added or deleted depending on Department application.

INSTRUCTIONS: The topics that are applicable on this sheet shall be reviewed by each new employee, outside contractor and visitor.

The new employee will check off topics covered by supervisor. At the end of orientation the employee and supervisor will certify orientation procedure was completed. The S.O.S. sheet will then be placed in the employee's personnel folder.

Visitors and outside contractor personnel will do the same but the sheet will be returned to the SAFETY Department.

TOPICS 1. EXPLAIN THE USE OF PERSONAL R. In Plant Speed Limit 15 M.P.H. PROTECTION EQUIPMENT: 3. EXPLAIN CHEMICAL HAZARDS A. Issue Hard Hat B. Issue SAFETY glasses with attached Slide Shields A. Chlorine **B. Caustic Soda** C. Contact lenses are prohibited C. Asbestos in plant operating areas. D. Hydrogen D. Issue Chlorine Escape Respirator E. Acids (Demonstrate Use, Inspection, and Care for Respirator, Have F. Hydrazine (A-50) Olin Employees Sign Respirator Form) Explain Precautionary Measures That Must Be E. Issue Chemical Splash Goggles Taken and Protective Equipment Needed For F. Issue Work Respirator, if required, and Each Chemical. fit test Employee 4. Explain Applicable Electrical Hazards, e.g., Cell Rooms G Others **SAFETY Shoes** 5. EXPLAIN DEPARTMENT'S Gloves-Type PROCEDURE ON: Rubber Boots Coveralis A. Chlorine Release Evacuation Ear Protection **B. Reporting Fires:** 2. EXPLAIN LOCATION OF: **Outside Plant** A. SAFETY Showers Inside Plant B. Eye Wash Stations C. Fire Evacuation Self Contained D. Chemical Spill **Breathing Apparatus** E. Report Injuries Immediately D. Fire Extinguishers F. Review Policy of Employee E. Hose-Hydrant Houses Access to Medical Records F. Medical Department G. Plant Alarm Test Conducted Each Tuesday at 9:00 a.m. G. Rescue Equipment H. Emergency Telephone and Radio 6. EXPLAIN USE OF MATERIAL SAFETY DATA SHEETS AND AVAILABILITY/ HAZARDOUS COMMUNICATIONS Communications (Issue Fire and **Emergency Reporting Procedures)** Dial 222 to Report Any Emergency STANDARDS (HAZCOM) I. Reporting of Unsafe 7. REVIEW TOXIC SUBSTANCE'S CONTROL ACT AND HAVE OLIN EMPLOYEE SIGN OFF ON FORM Conditions or Acts J. SAFETY Meeting Policy K. Job SAFETY Practices 8. EXPLAIN USE OF SAFETY POLICIES and Break In AND CRITICAL SAFETY POLICIES: L. Smoking Rules A. Hot Work M. Storm Warning and Evacuation Procedure B. Line Breaking C. Vessel or Confined Space Entry N. Explain the Importance of Good Housekeeping in Department D. High Work O. Explain Importance of Wind Sock E. Electrical Lockout Location, Wind Direction and How F. Excavation to Quarter Wind to Exit Chlorine Gas Cloud or Release 9. Viewed Safety Orientation Film P. Discuss Security **ADDITIONAL TOPICS** Program and Rules Q. Provide itemized List of Tools Provided by Company or Employee _ certify that applicable departmental topics were explained SUPERVISOR to employee/visitor/outside contractor whose signature appears below on DATE OUTSIDE CONTRACTOR EMPLOYEE OLIN EMPLOYEE

VISITOR COMPANY

Return original to Safety Dept.

Supervisor will retain other copy

EVACUATION PROCEDURE

Purpose

To establish a system for responding to the emergency alarm.

When Emergency Alarm Is Sounded The Following Action Shall Take Place:

- 1) Any Production personnel not directly involved in handling/correcting the emergency situation will immediately report to their area production office or central control room. Assignments will be given according to the extent of the emergency.
- 2) All visitors, vendors, truck drivers, office workers, engineerings, non-essential personnel who regularly work day shift shall evacuate to a safe area, preferably one of the following designated evacuation assembly areas:
 - A. Parking lot north of Administration Building (North West)
 - B. Construction Security Station (North East)
 - C. Old Construction Security Station, south side of plant (South)

Those individuals who exit the plant perimeter fence via the furthermost northeast and northwest double gate (Gate #7, Gate #28) must continue on to their normal preassigned plant evacuation assembly area.

If you come in contact with chlorine gas while evacuating, use respirator and continue on to the upwind evacuation area.

- The state of the s
- 4) Supervisors or designee of each department are responsible to conduct a head count of their employees.
- 5) All visitors, vendors, truck drivers, office workers, engineering, non-essential maintenance and production personnel are to remain at their assigned evacuation assembly area until:
 - A. They are notified to return to their respected job sites, via the emergency broadcast system receiver or pager.

Evacuation Procedure (Continued)

- B. The continuous all clear alarm is sounded for one minute.
- C. Wind direction changes or the release continues, dictating the need for further evacuation measures. Further planning for worsening conditions must take place among team leaders once head counts are complete.
- 6) When assembled in one of the north assembly areas and the need dictates, all personnel will be asked to leave via their personal vehicles. All employees are to report to the Guest House for further head count evaluation or one of the other remote head count areas (see attached map).
- 7) When assembled at the south assembly area and the need dictates, all personnel will evacuate to the west using river road or Industrial road leading to Highway 43. The wind direction will dictate which of these two will be taken.
- 8) The Guest House will serve as an alternate evacuation assembly area and an alternate first aid station.
- 9) Under no circumstances shall anyone give information to news media. This is the Plant Manager's or the Industrial Relations Manager's responsibility.
- 10) During an emergency situation, plant personnel may be requested by their supervisor to assist other operating personnel.
- 11) In case of fire, production and maintenance personnel assigned to the emergency response team shall assemble at the fire truck, unless the fire is in the emergency response team members area. In this case, fire extinguishers and fire hoses from the hose houses in the affected area shall be employed until additional emergency response team members arrive.
- 12) Shift Supervisors and Other Production Supervision in Plant on an Off Shift:

Evacuation Procedure (Continued)

- A. Take any immediate action necessary to protect "In-Plant" and "Out-Plant" personnel and/or property.
- B. A period of time can be expected before the staff emergency control can be put into action; during this time, the shift supervisor must be prepared to take action as needed. Never allow personnel to enter a hazardous area without protective equipment until a second man adequately equipped is on standby.
- C. Any injuries must be attended to. This may mean calling for assistance from a supervisor who is not in the emergency area. Emergency rescue teams outside the plant may be utilized as deemed necessary, i.e. McIntosh Fire and Rescue Squad, Southflite, etc.
- 13) If it is a major emergency a command post will be selected. After the command post is established and the emergency controllers have arrived, further specific instructions will be communicated. These messages will be communicated with the emergency communications/broadcast system or by in plant radio. The location of the command post will be determined by the nature of the emergency, i.e. severity of chemical release, wind direction, wind velocity, etc.
- 14) If deemed necessary by a member of supervision, the Security Officer is responsible to call for assistance from local agencies ie, police, sheriff, fire department, rescue squad, southflite, etc. The security officer will also notify Ciba-Geigy of the emergency situation.

COMMUNITY ALARM:

The Greater Washington County Community Assistance Corporation (GWCCAC) was established to have an effective plan to successfully evacuate the community as a result of any emergency condition that resulted in the release of toxic chemicals.

The community emergency evacuation alarms are located at the following locations:

Barge Dock Brine Wells Fire House Reed's Chapel School

Note: The old community alarm is still operable and will serve as a back-up. This alarm is located in the Olin plant and is activated by the chlorine operator.

Evacuation Procedure (Continued)

The chlorine operator in Central Control is responsible for activation of this alarm for each occurrence whether for test or actual emergencies.

This alarm system is activated on the first and third Tuesday each month at 8:45 a.m. as a test.

If the plant is incurring normal maintenance or has chlorine leaks that are controllable and being attended, there is not a need to contact the community. DO NOT SOUND THE ALARM unless the leak is of such a nature that in your judgement, it will go beyond the plant perimeter fence and reach a populated area. During off-shifts, the Shift Supervisors have the authority to sound the community evacuation alarm. Good judgement must be utilized because when the alarm is activated, the community will begin evacuation procedures.

If the plant has a chlorine leak that may develop into a major leak of the magnitude described, notify the Security Officer so that he or she can stand by to activate the telephone communication system to warn the community if evacuation is required. If the plant "crashes" down and the EVS is properly handling the situation, notify the Security Officer at the Main Security Station to stand by so that the telephone communication system can be activated if the situation deteriorates and evacuation is required.

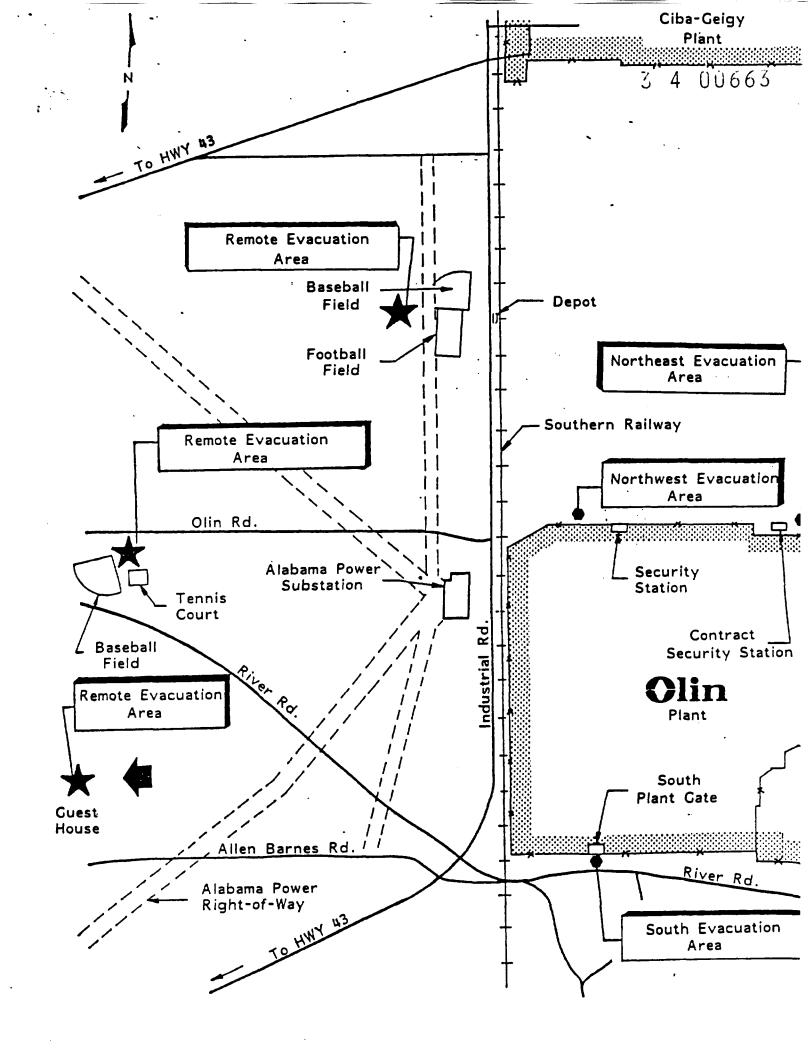
PLANT ALARM:

The Plant Alarm is tested every Tuesday, at 9:00 a.m. The chlorine operator in central control is responsible for activation of this alarm.

IN-PLANT COMMUNITY EVACUATION ROUTE:

If during an emergency, the normal evacuation routes for the community south of the plant cannot be used due to wind direction, road blocks, etc. The community will be allowed to evacuate through our plant.

The Olin community evacuation route is clearly identified with directional signs. The route begins at gate #21 south side of the plant off River Road. It proceeds through the plant around the PH ponds through gate #17 to the basin road. Gates #21 and #17 must be unlocked. Ciba Geigy's gate on the basin road must also be unlocked by Geigy to allow the community to continue evacuation on through Geigy's property.



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APPENDIX C MATERIAL SAFETY DATA SHEETS

MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION 1145 CATALYN STREET SCHENECTADY, NY 12303-1836 USA (518) 377-8855



NO. __366

CHLOROBENZENE Revision A

DATE November 1982

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME. CHLOROBENZENE

OTHER DESIGNATIONS: Chlorobenzol, Monochlorobenzene, Phenyl Chloride, C_6H_5Cl ,

CAS #000 108 907

MANUFACTURER: Available from several suppliers.



SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Chlorobenzene .	ra 100	8-hr TWA 75ppm or 350 mg/m *
*Current OSHA PEL and ACGIH (1982) TLV. Long term bipassay was underway at NCI in 1980.		Rat, Oral LD ₅₀ 2910 mg/kg Mouse, Inhalation LCLo 15 gm/m

SECTION III. PHYSICAL DATA

Boiling point, 1 atm, deg C	132	Specific gravity (H_O=1)	1.11
Vapor pressure at 25 C, mm Hg	11.8	Melting point, deg C	ca -45
Vapor density (Air=1)	3.9	Evaporation rate (n-BuAc=1) -	1.0
Water solubility, 25C, g/100g H ₂ O	0.049	Volatiles, %	ca 100
Log Octanal/water Partition	2.83	Molecular weight	112.56

Appearance & Odor: A clear, colorless, volatile liquid with a faint, almond-like odor. Threshold odor conc: 100% recognition, 0.21 ppm. Good warning properties.

SECTION IV. FIRE AND EXPL	Lower	Upper		
Flash Point and Method	Autoignition Temp.	Flommability Limits in Air		7.1%
29C (84F) (TCC)	638 C (1180F)	by Volume		9.6% @150C

Extinguishing Media: CO₂, dry chemical, or foam. A water spray can be used to control small fires or cool fire-exposed containers. A layer of water can be used to blanket chlorobenzene and may be useful for extinguishing fire in an open tank.

Vapors of this material may flow along surfaces for a considerable distance, reach an ignition source, and flash back. A dangerous fire hazard when exposed to heat or flame. Firefighters should use eye protection and self-contained breathing apparatus in fight-ing fires in which this material is involved.

SECTION V. REACTIVITY DATA

This is a stable material in closed containers at room temperature under normal storage and handling conditions. It does not polymerize. It is incompatible with oxidizing agents. Chlorobenzene can react violently with dimethyl sulfoxide. Silver perchlorate will form a solvated salt with chlorobenzene which is shock sensitive (explosion). Thermal-oxidative degradation products can include soot, hydrogen chloride, phosgene, and carbon monoxide.

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NO	366
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SECTION VI. HEALTH HAZARD INFORMATION

TLV 75 ppm (See Sect II)

Chlorobenzene is a fairly strong narcotic and can cause CNS depression. Overexposure is irritating to the eyes, nasal passages, and upper respiratory tract. It is moderately toxic by inhalation or ingestion and can be absorbed slowly through the skin. Short exposures to liquid may cause skin irritation and defatting, while prolonged or repeated skin contact may result in dermatitis or skin burns.

Repeated inhalation exposures to animals at 1,000 ppm over a period of 44 days resulted in lung, liver, and kidney changes: at 475 ppm slight liver changes were observed: no abnormal effects noted at 200 ppm. Symptoms to be expected from acute exposure are headache, dizziness, drowsiness, cyanosis, spastic contractions of extremities, and loss of consciousness, depending on conc. and time of exposure.
FIRST AID:

Eye Contact: Flush thoroughly with running water for 15 min. including under eyelids. Skin Contact: Remove contaminated clothing. Wash area promptly with soap & water. Inhalation: Remove to fresh air. Restore and/or support breathing as required. Ingestion: Contact physician and/or transport for gastric lavage.

Seek prompt medical help for treatment, observation and support after first aid.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Make prior plans to handle emergencies. Suppliers can be helpful.

Eliminate ignition sources; notify safety personnel. Provide ventilation (explosion proof). Clean up workers need protection against inhalation of vapors and contact with liquid. Collect spill with absorbent solid, such as paper or sawdust, or as a liquid and place in sealed metal container for disposal. Use non-sparking tools.

<u>DISPOSAL</u>: Dispose of scrap by burning in an approved incinerator with a scrubber, or dispose of through a licensed waste disposal company. Follow Federal, State and Local regulations.

AQUATIC TOXICITY TLm 96: 100-lppm

EPA (RCRA) HW No. U037 (40CFR261). EPA(CWA) RO 100 1b (40 CFR 117)

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide adequate general and local exhaust ventilation (explosion-proof equipment!) to meet TLV requirements. Use a chemical cartridge respirator with a full facepiece and and an organic vapor cartridge for vapor conc. < 1000 ppm. A self-contained breathing apparatus with full facepiece is suitable to use up to 2400 ppm.

Use impervious (VITON is best; neoprene, "fair") gloves, aprons, protective clothing, etc. to avoid skin contact with liquid. Use chemical safety goggles where splashing is possible. Clothing soiled with liquid to be removed promptly and laundered before reuse. Provide an eyewash station and safety shower in area of use and handling.

Preplacement and periodic medical examinations should emphasize skin, liver, lung, and kidney disorders. Those with such problems may be at an increased risk from exposure.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in tightly closed containers in a well-ventilated, fire-resistant area away from heat, sources of ignition, and oxidizing agents. Outside or detached area preferred. Storage and handling must be suitable for an OSHA Class IC Flammable Liquid. Protect containers from physical damage.

Ground and bond containers and equipment for transfers to avoid static sparks. Use nonsparking tools. Electrical services must meet code. Use safety cans for small amounts. Avoid breathing vapors! Avoid contact with liquid. Do not ingest.

DOT Classification: FLAMMABLE LIQUID I.D. No. ON1134 Label: FLAMMABLE LIQUID

DATA SOURCE(S) CODE: 2-12,14,16,23,25-27,31,34,37,38,45-47,49

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MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION 1145 CATALYN STREET SCHENECTADY, NY 12303-1836 USA (518) 377-8855



NO. __514

P-DICHLOROBENZENE

DATE October 1983

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: P-DICHLOROBENZENE

OTHER DESIGNATIONS: 1,4-Dichlorobenzene, p-Dichlorobenzol, Paradichlorobenzene, PDCB, CAS #000 106 467

MANUFACTURER: Available from several suppliers, including: Standard Chlorine Chemical Co. 1035 Belleville Turnpike Kearny, NJ 07032 Tel: (201)997-1700

Dow Chemical Co. 2020 Dow Center Midland, MI 48640 Tel: (517)636-1000

	%	HAZARD DATA
CI	>99	8-hr TWA 75 ppm or 450 mg/m ³ *
		Human, Oral TDLo 300 mg/kg TFX:Systemic effect Rat, Oral LD ₅₀ 500 mg/kg
		>99

SECTION III. PHYSICAL DATA

Boiling point, 1 atm, deg C (F) -- 174 (345) Specific gravity (liquid) 55/4C -- 1.248 (Solid sublimes slowly at 25C) Specific gravity (solid) 20/4C --- 1.458 Melting point, deg C ----- 53

Vapor pressure, 25C, mm Hg ----- 0.4 Solubility in water, gm/100gm ---- 0.008

Molecular weight ----- 147

Appearance & Odor: A clear liquid melt or white crystals or flakes; distinctive mothballlike odor, detectable at 15-30 ppm with a strong odor at 30-60 ppm. (PDCB has good parning properties)

SECTION IV. FIRE AND EXP	Lower	Upper		
Flash Point and Method	Autoignition Temp.	Flommability Limits in Air		
>150F (TCC)	>560C	% by volume	2.5	-

Extinguishing media: Dry chemical, carbon dioxide, alcohol foam, water spray. Explosive mixtures may be formed in air when this material is heated, such as in a fire. Use water spray to keep fire exposed containers cool, to disperse vapors, or to blanket a pool fire.

Firefighters should wear self-contained breathing apparatus.

SECTION V. REACTIVITY DATA

hydrogen chloride.

PDCB is a stable material in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization. It is incompatible with strong oxidizers such as chlorine and permanganate. Thermal-oxidative degradation products include carbon dioxide, carbon monoxide and

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SECTION VI. HEALTH HAZARD INFORMATION

TLV 75 ppm (See Sect II)

Excessive inhalation of vapors/fumes or dust is irritating to upper respiratory tract. Vapors are readily absorbed through the lungs. Painful irritation to the nose and eyes can occur at 50-80 ppm, severe discomfort at 160 ppm. Inhalation above the TLV causes headache, rhinitis, nausea, dizziness and anorexia. Chronic excessive exposure may damage the kidneys and liver.

Skin contact causes very little irritation. Solid material can cause slight burning sensation when held close to body. Contact with liquid PDCB is irritating. Prolonged or repeated skin contact with warm fumes or strong soln. may cause slight irritation. No evidence of hazardous absorption through skin.

FIRST AID:

Eye Contact: Flush thoroughly with running water for 15 min. including under eyelids. Skin Contact: Remove contaminated clothing. Wash affected area with soap and water. Inhalation: Remove to fresh air. Restore and/or support breathing as needed.

Ingestion: Give 2-3 glasses of water. Induce vomiting.
Seek medical assistance for further treatment, observation and support after first aid.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel. Remove sources of heat or ignition.

Provide adequate ventilation. Clean up personnel to use protective equipment to avoid liquid contact or vapor inhalation.

Contain liquid spills by diking; allow to cool and solidify. Scoop up solid and place in appropriate drums for disposal or reclamation. Absorbent solid can be used with small liquid spills.

DISPOSAL: Waste can be burned in an approved, scrubber-equipped incinerator, deposited in an approved landfill, or disposed of via a licensed waste disposal company.

Follow Federal, State, and Local regulations.

FPA(RCRA) HW No. 1072 [40 CFR 261], EPA(CWA) RQ is 100 1b. [40 CFR 117]

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide adequate general and local exhaust ventilation to meet TLV requirements. Respirators with full facepeice should be available for nonroutine and emergency use above the TLV. Self-contained breathing apparatus or gas mask with organic vapor canister and dust filter is suitable to 1000 ppm.

Use neoprene gloves and safety glasses. (Use of body covering clothing, faceshield and other protection may be indicated by specific conditions to avoid contact.)

Eyewash stations and washing facilities should be accessible to areas of use and handling.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers in a cool, dry, well-ventilated area away from oxidizing agents and from sources of heat and ignition. Protect containers from physical damage. Outside or detached storage is preferred.

Avoid inhalation of dust or vapors. Avoid contact with eyes and skin (especially when heated). Practice good personal hygiene. Launder contaminated clothing before reuse. Acute overexposure unlikely due to warning properties (odor and irritation). Individual may develop tolerance to high levels of exposure.

DOT Classification: ORM-A I.D. No. UN1592 LABEL: None

DATA SOURCE(S) CODE: 1-7,9,10,12,14,16,23,26,31,34,43,48

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APPROVALS: MIS/CRD

INDUST. HYGIENE SAFETY

MEDICAL REVIEW

17 September 1983

From Genium's Reference Collection Genium Publishing Corporation 1145 Catalyn Street Schenectady, NY 12303-1836 USA (518) 377-8855



No. 315 4 00669

CHLOROFORM (Revision D)

Issued: August 1979 Revised: April 1988

SECTION 1. MATERIAL IDENTIFICATION

Material Name: CHLOROFORM

Description (Origin/Uses): Used as a solvent for fats, oils, rubber, alkaloids, waxes, and resins; as a cleansing agent.

Other Designations: Trichloromethane; CHCl,; NIOSH RTECS No. FS9100000; CAS No. 0067-66-3

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the Chemicalweek

Buyers' Guide (Genium ref. 73) for a list of suppliers.

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SECTION 2. INGREDIENTS AND HAZARDS	%	EXPOSURE LIMITS
Chloroform, CAS No. 0067-66-3	Ca 100	OSHA PEL Ceiling: 50 ppm, 240 mg/m³
		ACGIH TLV, 1987-88 TLV-TWA: 10 ppm, 50 mg/m'
		NIOSH REL Ceiling: 2 ppm, 9.78 mg/m³
See NIOSH, RTECS, for additional toxicity data with references to mutagenic, reproductive, tumorigenic, and irritative effects.		Toxicity Data Human, Oral, LD ₁₂ : 140 mg/kg Rat, Oral, LD ₃₀ : 908 mg/kg

SECTION 3. PHYSICAL DATA

Boiling Point: 142°F (61°C) Melting Point: -82.3°F (-63.5°C)

Vapor Pressure: 158.4 Torrs at 68°F (20°C)

Vapor Density (Air = 1): 4.13

Water Solubility (%): 0.822 ml of CHCl, per

100 ml of H₂O at 68°F (20°C) % Volatile by Volume: 100 Molecular Weight: 119 Grams/Mole

Specific Gravity (H,O = 1): 1.484 at 68 F (20°C)

Appearance and Odor: A heavy, colorless, clear, volatile liquid; characteristic, pleasant, ethereal, sweet odor (recognition threshold: 0.3 mg/m³); sweet taste.

SECTION 4. FIRE AND EXPLOSION DATA		LOWER	UPPER	
Flash Point and Method	Autoignition Temperature	Flammability Limits in Air		
•	•	% by Volume	•	•

Extinguishing Media: *Chloroform does not burn. Use an agent that will put out the surrounding fire.

Unusual Fire or Explosion Hazards: None reported.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressuredemand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Chloroform is stable if kept in closed containers and protected from air and sunlight. It does not undergo hazardous polymerization; however, even when stabilized with ethanol, this material develops acidity from prolonged exposure to air and light.

Chemical Incompatibilities: This material is incompatible with strong alkalies.

Conditions to Avoid: Avoid prolonged exposure to air and light and to strong alkalies.

Hazardous Products of Decomposition: Toxic and corrosive gases like hydrochloric acid (HCl), chlorine (CL), carbon monoxide (CO), and oxides of chlorine (ClO) can be produced during fires.

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SECTION 6. HEALTH HAZARD INFORMATION

Chloroform is listed as a suspected human carcinogen by ACGIH.

Summary of Risks: Exposure to this material affects the central nervous system (anesthesia); heart (arrhythmia, ventricular tachycardia, bradycardia); liver (necrosis, hepatoma); kidney (necrosis); and it is an embryonic toxin. Fatalities are associated with cardiovascular depression and ventricular fibrillation.

Medical Conditions Aggravated by Long-Term Exposure: Ailments of the heart, liver, and kidneys may be worsened by exposure to chloroform. Target Organs: Liver, kidneys, heart, skin, eyes. Primary Entry: Skin contact, inhalation. Acute Effects: Dizziness, mental duliness, nausea, headache, fatigue, and anesthesia. Chronic Effects: Possible cancer. FIRST AID

Eyes: Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. Skin: Immediately wash the affected area with soap and water. Inhalation: Remove the exposed person to fresh air; restore and/or support his or her breathing as needed.

Ingestion: Never give anything by mouth to someone who is unconscious or convulsing. If the exposed person is responsive, give him

or her several glasses of milk or water to drink and induce vomiting. Repeat if large quantities were ingested.

Comments: Workers who are regularly exposed to chloroform require preplacement and periodic medical exams emphasizing kidney, liver, skin, and central nervous system functions. Carefully evaluate each exposure that produces a noticeable effect to determine the extent to which factors like alcohol or drugs have affected it.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel of a chloroform spill or leak. Provide ventilation. Cleanup personnel need protection against contact with and inhalation of vapor (see sect. 8). Chloroform vapor is heavier than air and will collect in low-lying areas. Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.

Waste Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

OSHA Designations

Air Contaminant (29 CFR 1910.1000 Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U044

CERCLA Hazardous Substance, Reportable Quantity: 5000 lbs (2270 kg)

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield as a supplementary protective measure. Follow the eye- and face-protection guidelines in 29 CFR 1910.133. Respirator: Wear a NIOSHapproved respirator per the NIOSH Pocket Guide to Chemical Ilazards for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow the respirator guidelines in 29 CFR 1910.134. For emergency or nonroutine use (e.g., cleaning reactor vessels or storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. Warning: Air-purifying respirators will not protect workers in oxygen-deficient atmospheres. Other: To prevent contact with skin, wear impervious gloves, boots, aprons, gauntlets, etc., as required by the specific work environment. Ventilation: Install and operate general and local ventilation systems that are powerful enough to maintain airborne levels of chloroform below the OSHA PEL standard cited in section 2. Safety Stations: Make eyewash stations, washing facilities, and safety showers available in use and handling areas. Contaminated Equipment: Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do not wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment. Comments: Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do not eat, drink, or smoke in any work area. Avoid inhalation of vapor!

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store chloroform in closed containers away from light and alkalies.

Special Handling/Storage: Protect containers from physical damage. Do not transfer chloroform through plastic or rubber hoses or

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Chloroform

DOT Class: ORM-A

DOT Label: None DOT ID No. UN1888 IMO Label: Poison

IMO Class: 6.1

References: 1, 2, 12, 73, 84-94, 100, 103.

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No. 316

BENZENE (Revision D)

Issued: November 1978 Revised: April 1988

SECTION 1. MATERIAL IDENTIFICATION

Material Name: BENZENE

Description (Origin/Uses): Used in the manufacture of medicinal chemicals, dyes, linoleum, airplane dopes,

varnishes, and lacquers; and as a solvent for waxes, resins, and oils.

Other Designations: Benzol; Phene; Phenylhydride; C.H., NIOSH RTECS No. CY1400000; CAS No. 0071-43-2

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the Chemicalweek

Buyers' Guide (Genium ref. 73) for a list of suppliers.

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*See sect. 8

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SECTION 2. INGREDIENTS AND HAZARDS

Benzene, CAS No. 0071-43-2



*See NIOSH, RTECS, for additional data with references to irritative, mutagenic, tumorigenic, and reproductive effects.

EXPOSURE LIMITS OSHA PEL Ca 100

8-Hr TWA: 1 ppm 15-Min Ceiling: 5 ppm Action Level: 0.5 ppm

ACGIH TLV, 1987-88 TLV-TWA: 10 ppm, 30 mg/m3

Toxicity Data* Human, Inhalation, LC₁: 2000 ppm/5 Min Human, Oral, TD₁: 130 mg/kg Human, Inhalation, TC 210 ppm

SECTION 3. PHYSICAL DATA

Boiling Point: 176°F (80°C) Melting Point: 42°F (5.5°C)

Vapor Pressure: 75 Torrs at 68°F (20°C)

Vapor Density (Air = 1): >1

Water Solubility (%): Slight % Volatile by Volume: 100 Molecular Weight: 78 Grams/Mole

Specific Gravity (H.O = 1): 0.87865 at $68^{\circ}F$ (20°C)

Appearance and Odor: A colorless liquid; characteristic aromatic odor.

SECTION 4. FIRE AND EXPLOSION DATA		LOWER	UPPER	
Flash Point and Method	Autoignition Temperature	Flammability Limits in Air		
12°F (-11.1°C) CC	928°F (498°C)	% by Volume	1.3%	7.1%

Extinguishing Media: Use dry chemical, foam, or carbon dioxide to put out benzone fires. Water may be ineffective as an extinguishing agent because it can scatter and spread the fire. Use water to cool fire-exposed containers, flush spills away from exposures, disperse benzene vapor, and protect personnel attempting to stop an unignited benzene leak.

Unusual Fire or Explosion Hazards: Benzene vapor is heavier than air and can collect in low-lying areas such as sumps or wells. Eliminate all sources of ignition there to prevent a dangerous flashback to the original liquid benzene. Danger: Explosive and flammable benzene vapor-air mixtures can easily form at room temperature; always use this material in a way that minimizes dispersion of its vapor into general work areas.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressuredemand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Benzene is stable in closed containers during routine operations. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Hazardous chemical reactions involving benzene and the following materials are reported in Genium reference 84; bromine pentafluoride, chlorine, chlorine trifluoride, chromic anhydride, nitryl perchlorate, oxygen, ozone, perchlorates, perchloryl fluoride and aluminum chloride, permanganates and sulfuric acid, potassium peroxide, silver perchlorate, and sodium peroxide.

Conditions to Avoid: Avoid all exposure to sources of ignition and to incompatible chemicals.

Hazardous Products of Decomposition: Toxic gases like carbon monoxide (CO) may be produced during benzene fires.

SECTION 6. HEALTH HAZARD INFORMATION

Benzene is listed as a suspected human carcinogen by the ACGIH.

Summary of Risks: Prolonged skin contact with benzene or excessive inhalation of its vapor may cause headache, weakness, loss of appetite, and lassitude. Continued exposure can cause collapse, bronchitis, and pneumonia. The most important health hazards are cancer (leukemia), bone marrow effects, and injuries to the blood-forming tissue from chronic low-level exposure.

Medical Conditions Aggravated by Long-Term Exposure: Ailments of the heart, lungs, liver, kidneys, blood, and central nervous system (CNS) may be worsened by exposure. Administer preplacement and periodic medical exams emphasizing these organs' functions and reassign workers who test positive. Target Organs: Blood, CNS, bone marrow, eyes, and upper respiratory tract (URT). Primary Entry: Skin contact, inhalation. Acute Effects: Dizziness, mental dullness, nausea, headache, fatigue, and giddiness. Chronic Effects: Possible cancer (leukemia).

FIRST AID

Eyes: Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. Skin: Immediately wash the affected area with soap and water.

Inhalation: Remove the exposed person to fresh air; restore and/or support his or her breathing as needed.

Ingestion: Never give anything by mouth to someone who is unconscious or convulsing. Do not induce vomiting because of the possibility of aspiration.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, provide ventilation, and eliminate all sources of ignition immediately. Cleanup personnel need protection against contact with and inhalation of vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.

Waste Disposal: Contact your supplier or a licensed contractor for detailed recommendations for disposal. Follow Federal, state, and local regulations.

OSHA Designations

Air Contaminant (29 CFR 1910.1000 Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U019

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg)

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield. Follow the eye- and face-protection guidelines in 29 CFR 1910.133. Respirator: Wear a NIOSH-approved respirator per the NIOSH Pocket Guide to Chemical Hazards for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow the respirator guidelines in 29 CFR 1910.134. For emergency or nonroutine use (e.g., cleaning reactor vessels or storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. Warning: Air-purifying respirators will not protect workers in oxygen-deficient atmospheres. Other: Wear impervious gloves, boots, aprons, gauntlets, etc., to prevent any possibility of skin contact with this suspected human carcinogen. Ventilation: Install and operate general and local ventilation systems powerful enough to maintain airborne levels of benzene below the OSHA PEL standard cited in section 2.

Safety Stations: Make eyewash stations, washing facilities, and safety showers available in use and handling areas. Contaminated Equipment: Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do not wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment. Comments: Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do not eat, drink, or smoke in any work area. Do not inhale benzene vapor!

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store benzene in a cool, dry, well-ventilated area away from sources of ignition and incompatible chemicals. Special Handling/Storage: Protect containers from physical damage. Electrically ground and bond all metal containers used in shipping or transferring operations. Follow all parts of 29 CFR 1910.1028.

Engineering Controls: All engineering systems (production, transportation, etc.) must be of maximum explosion-proof design (non-sparking, electrically grounded and bonded, etc.)

Comments: If possible, substitute less toxic solvents for benzene; use this material with extreme caution and only if it is absolutely essential.

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Benzene DOT Class: Flammable Liquid DOT Label: Flammable Liquid DOT ID No. UN1114

IMO Label: Flammable Liquid

IMO Class: 3.2

References: 1, 2, 12, 73, 84-94, 100, 103.

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No. 26 3 4 00673

MERCURY (Revision C)

Issued: September 1981 Revised: August 1988

SECTION 1. MATERIAL IDENTIFICATION

Material Name: MERCURY

Description (Origin/Uses): Used in barometers, thermometers, hydrometers, and pyrometers; in mercury are lamps producing ultraviolet rays; in switches and fluorescent lamps; as a catalyst in oxidations of organic

compounds; in alloys; in explosives; and for extracting gold and silver from ore.

Other Designations: Colloidal Mercury; Metallic Mercury; Quicksilver; Hg; Hydrargyrum; CAS No. 7439-97-6

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the Chemicalweek

Buyers' Guide (Genium ref. 73) for a list of suppliers. Comments: Inorganic and organic mercury compounds are highly toxic, as is pure mercury.

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SECTION 2. INGREDIENTS AND HAZARDS	%
Mercury, CAS No. 7439-97-6	Ca 100
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EXPOSURE LIMITS OSHA PEL Ceiling: 1 mg per 10 m³

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*See sect. 8

ACGIH TLV (Skin*), 1987-88 TLV-TWA: 0.05 mg/m3 as Hg (Mercury Vapor)

Toxicity Data** Rabbit, Inhalation, LC₁₆: 29 mg/m³ (30 Hrs)

reproductive, mutagenic, and tumorigenic effects. SECTION 3. PHYSICAL DATA

*Mercury can be absorbed through intact skin, which contributes to

**See NIOSH, RTECS (OV4550000), for additional data with references to

Boiling Point: 673°F (357°C)

overall exposure.

Specific Gravity (H₁O = 1): 13.546 at 68°F (20°C) Vapor Pressure: 0.0018 Torr at 77°F (25°C)

Water Solubility (%): Insoluble Molecular Weight: 201 Grams/Mole Melting Point: -37.93°F (-38.85°C)

Appearance and Odor: A silver, heavy liquid; odorless. Danger: Mercury vapor has no warning properties.

SECTION 4. FIRE	AND EXPLOSION DA	TA	LOWER	UPPER
Flash Point and Method	Autoignition Temperature	Flammability Limits in Air		
		% by Volume	•	*

Extinguishing Media: *Mercury does not burn. Use extinguishing agents that will put out the surrounding fire.

Unusual Fire or Explosion Hazards: When exposed to the high temperatures that occur during a fire, mercury can vaporize to form extremely toxic fumes.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressuredemand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Mercury is stable in closed containers at room temperature under normal storage and handling conditions. It cannot undergo hazardous polymerization.

Chemical Incompatibilities: Hazardous reactions involving mercury and acetylene, ammonia, boron phosphodiiodide, chlorine, chlorine dioxide, methyl azide, sodium carbide, nitric acid, oleum, and sulfuric acid are reported (Genium ref. 84).

Conditions to Avoid: Do not expose mercury to incompatible chemicals.

Hazardous Products of Decomposition: Extremely toxic mercury metal fumes are likely to be produced during fires.

SECTION 6. HEALTH HAZARD INFORMATION

Mercury is not listed as a carcinogen by the NTP, IARC, or OSHA.

Summary of Risks: Mercury is very toxic due to its liquid and fat solubility, lack of charge, and membrane permeability. It is a slowly cumulative poison that concentrates in the brain, kidneys, and liver. It is very hazardous when spilled or heated. Mercury and its vapor are rapidly absorbed by the membranes lining the respiratory tract, the gastrointestinal (GI) tract, and the skin. Mercury is a teratogen (causes physical defects in embryos). Medical Conditions Aggravated by Long-Term Exposure: Preexisting problems of the target organs can be worsened. Provide preplacement and periodic medical exams emphasizing the target organs. Target Organs: Skin, eyes, respiratory system, central nervous system (CNS), kidneys. Primary Entry: Skin absorption/contact, inhalation. Acute Effects: Erosion of the respiratory/GI tracts, nausea, vomiting, bloody diarrhea, shock, headache, metallic taste. Inhalation of high concentrations for short periods can cause pneumonitis, chest pain, dyspnea, coughing, stomatitis, gingivitis, and salivation. Chronic Effects: Tremors, emotional problems, loss of concentration, depression, drowsiness, fatigue, insomnia, loss of memory, kidney problems, eye lesions, vision disturbances, sore mouth and throat, problems with the sense of taste or smell, nosebleeds, nasal inflammation, loss of weight or appetite, poor hand-eye coordination, awkwardness, and unsteadiness, as well as dermatitis. FIRST AID: Eyes. Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of ruming water for at least 15 minutes. Skin. Immediately wash the affected area with soap and water because of the increased exposure from skin absorption. Inhalation. Remove exposed person to fresh air; restore and/or support his or her breathing as needed. Have medical personnel administer oxygen to treat the chemical pneumonitis that may develop. Ingestion. Never give anything by mouth to someone who is unconscious or convulsing. Note to physician: If indicated by degree of ingestion, saline cathartics and charcoal should be used. Chelation therapy with d-penicillamine may also be indicated.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid. Treatment of chronic mercury poisoning requires expert medical care. At the first signs, immediately remove the exposed person from further exposure and have him or her examined and treated by a physician trained in occupational mercury poisoning.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, restrict access to the spill area to necessary personnel, and provide adequate ventilation. Clean up spills promptly. Specialized equipment and/or techniques may be required to safely deal with large mercury spills; if large quantities of mercury are used in the workplace, detailed, prior spill-management planning is recommended. Collect spilled mercury by using a suction pump and an aspirator bottle with a long capillary tube. For finely divided mercury in inaccessible cracks, corners, etc., treatment with calcium polysulfide and excess sulfur is recommended to convert the mercury globules into mercury sulfide. Vacuum cleaners may be used if they are equipped with specially designed mercury-absorbent exhaust filters. Collect the mercury into tightly sealed containers for later disposal or reclamation. Cleanup personnel must use the recommended personal protective equipment (see sect. 8).

Waste Disposal: Consider reclamation, recycling, or destruction rather than disposal in a landfill. Do not pour mercury down a drain. Mercury is very harmful to the environment. Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

OSHA Designations

Air Contaminant (29 CFR 19010.1000 Subpart Z)

EPA Designations (40 CFR 302.4) RCRA Hazardous Waste No. U151

CERCLA Hazardous Substance, Reportable Quantity: 1 lb (0.454 kg)*

*Per the Clean Water Act, § 407 (a); Clean Air Act, § 112; and Resource Conservation and Recovery Act, § 3001.

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing of mercury may occur, wear a full face shield or splash guard. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133).

Respirator: Use a NIOSH-approved respirator per the NIOSH Pocket Guide to Chemical Hazards for the maximum-use concentrations

and/or the exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). Other: Wear impervious gloves, boots, aprons, gauntlets, etc., to prevent any contact with mercury and the skin.

Ventilation: Install and operate general and local ventilation systems powerful enough to continuously maintain airborne levels of mercury below the OSHA PEL standard cited in section 2.

Safety Stations: Make emergency eyewash stations, washing facilities, and safety/quick-drench showers available in work areas. Contaminated Equipment: Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do not wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean mercury from shoes and equipment. Separate work and street clothes; store work clothes in special lockers and always shower before changing to street clothes. Comments: Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do not eat, drink, or smoke in any work area.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store mercury in a cool, dry, well-ventilated area in tightly closed unbreakable polyethylene containers. Protect these containers from physical damage.

Special Handling/Storage: Construct storage areas to have smooth, hard, nonporous floors with no cracks or spaces so that spilled mercury globules do not form in inaccessible areas.

Comments: Mercury evaporates slowly, but if it is spilled it can form many tiny globules that evaporate much faster than a single pool of it will. In an unventilated area, significant concentration of mercury vapor can develop from this enhanced evaporation effect. This poisonous vapor is particularly hazardous if breathed over a long period of time, so spills or releases of mercury require very meticulous cleaning procedures.

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Mercury, Metal

DOT Hazard Class: ORM-B

DOT Label: None DOT ID No. NA2809 IMO Class: 8 IMO Label: Corrosive

References: 1, 2, 8, 26, 38, 84-94, 100.

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Prepared by PJ Igoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: MJ Hardies, MD

MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION 1145 CATALYN STREET SCHENECTADY, NY 12303-1836 USA (518) 377-8855



NO. __358 o-DICHLOROBENZENE

Revision B

DATE February 1984

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: O-DICHLOROBENZENE

OTHER DESIGNATIONS: DCB, 1,2-Dichlorobenzene, CAS# 000 095 501, orthodichlorobenzene,

C₆H₆Cl₂, o-Dichlorobenzol

MANUFACTURER: Available from many suppliers, including:

Dow Chemical, USA

Midland, MJ 48640 Emergency Phone: (517) 636-4400



SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
o-Dichlorobenzene Impurities:	>80	8-hr TWA 50 ppm (C)*
p-dichlorobenzene (MSDS 514) m-dichlorobenzene	<17 <2	75 ppm No TLV Established
*Current OSHA and ACGIH (1983) TLV. The ortho-isomer is considered to be more toxic than the meta- and para-isomers.		Rat, Oral LD ₅₀ SOO mg/hg
LOVERLAG.	1	Rat, Inhalation LCLo 821 ppm/7H

SECTION III. PHYSICAL DATA

Boiling point, 1 atm, deg C 180	Specific gravity, 25/25 C	1.3
Vapor pressure, 20 C, mm Hg 1.2	Volatiles %	
Vapor density (Air=1) 5.1	Evaporation rate (BuAc=1)	<1
Water solubility g/100 cc H ₂ 0 - 0.015	Melting point, deg C	
4	Molecular weight	147

Appearance & Odor: Colorless to pale yellow liquid with a pleasant aromatic odor at low concentration (irritation effects at higher levels). Odor perceptible at 2-4 ppm.

SECTION IV. FIRE AND EXPLOSION DATA			Lower	Upper
Flash Point and Method	Autoignition Temp.	Flammability Limits in Air		
151 F (TCC)	1198 F	% by Volume	2.2	9.2

Extinguishing Media: Dry chemical, carbon dioxide, alcohol foam, water spray. Under normal working conditions, it should not pose a fire hazard, because of its high flash point. Explosive mixture may form in air when material is heated, such as in a fire. Use water spray to keep fire exposed containers cool, to disperse vapors, or to flush spills away from exposures.

Firefighters should wear self-contained breathing apparatus.

SECTION V. REACTIVITY DATA

DCB is a stable material in closed containers at room temperature under normal storage and handling conditions. It does not polymerize.

Incompatible with strong oxidizers or heated aluminum and aluminum alloys.

Thermal-oxidative degradation products include oxides of carbon, hydrogen chloride and chlorine.

	358
NO.	

SECTION VI. HEALTH HAZARD INFORMATION

TLV 50 ppm (C) See Sect. II

The vapors are irritating to the skin, eyes, mucous membranes and upper respiratory tract. Excessive inhalation of vapors can cause drunkenness, anesthetic effect and CNS depression. Noticeable eye irritation at 25-30 ppm has been reported after brief exposure of a few minutes. Can be absorbed through the skin. Liquid contact with skin causes irritation. Prolonged or repeated contact may cause blister formation. Toxic effects can include hematological disorders and liver and kidney damage.

FIRST AID:

Eye Contact: Flush immediately with running water for 15 min. including under eyelids.

Skin Contact: Flush affected area with water while removing contaminated clothing.

Inhalation: Remove to fresh air. Restore and/or support breathing as needed.

Ingestion: Chemical aspiration hazard if vomiting is induced. Give 2-3 glasses of water or milk to drink to dilute. Contact physician. If victim has ingested toxic quantaties and medical help is not readily available, induce vomiting.

Seek medical assistance for further treatment, observation and support after first aid.

SECTION VII. SPILL LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel. Remove sources of heat or ignition. Provide adequate ventilation. Clean-up personnel to use protective equipment to avoid liquid contact or vapor inhalation.

Contain spills by diking. Collect liquid if feasible. Absorb small spills and residues on sand or vermiculate and place in a closed metal drum for disposal or reclamation.

DISPOSAL: Waste liquid can be burned in an approved, scrubber-equipped incinerator, buried in an approved landfill, or disposed of via a licensed waste disposal company. Follow Federal, State and Local regulations.

EPA (RCRA) Hazardous Waste No. U070 (40CFR261) EPA (CWA) RQ is 100 1b (40CFR117)

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide adequate general and local exhaust ventilation to meet TLV requirements.

A chemical cartridge respirator with an organic vapor cartridge and full facepiece can be used below 1000 ppm. Nonroutine or emergency situations require a self-contained breathing apparatus with full facepiece.

Wear rubber gloves and apron to prevent skin contact. Use chemical safety goggles for eye protection where splashing is possible.

Eyewash stations and washing facilities should be accessible in areas of use and handling. Launder contaminated clothing before reuse. Contaminated shoes should be discarded.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers in a cool, dry, well-ventilated area away from oxidizing agents and sources of heat and ignition. Protect containers from physical damage. Outside or detached storage preferred.

Avoid inhalation of vapors. Avoid contact with eyes and skin. Do not ingest. Practice good personal hygiene.

Acute overexposure unlikely due to good warning properties (odor, eye & respiratory irritation). Individuals may develop tolerance to high levels of exposure.

DOT Classification ORM-A I.D. No. UN 1591 Label: None

DATA SOURCE(S) CODE: 1-12, 14, 16, 23, 25-27, 31, 34, 37, 38, 43, 45-49, 53

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MEDICAL REVIEW: FEB 13 4-13

from Genium's Reference Collection Genium Publishing Corporation 1145 Catalyn Street Schenectady, NY 12303-1836 USA (518) 377-8855



No. 365 3 4 00677

1,2,4-TRICHLOROBENZENE

(Revision B)

Issued: December 1979 Revised: November 1988

SECTION 1. MATERIAL IDENTIFICATION

Material Name: 1,2,4-TRICHLOROBENZENE

Description (Origin/Uses): Used as a dielectric fluid, as a heat-transfer medium, in lubricants and insecticides,

and in organic synthesis.

Other Designations: TCB; TCB (Dielectric Grade); Trichlorobenzenes; Electrical Insulating Fluid; EIF; Electrical Trichlorobenzenes; C₂H₂Cl₄; CAS No. 0120-82-1

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the Chemicalweek

Buyers' Guide (Genium ref. 73) for a list of suppliers.



HMIS H 2 R 1 F 1 I 4 R 0 S 2 PPG* S 2

		Sec sect. 6
SECTION 2. INGREDIENTS AND HAZARDS	%	EXPOSURE LIMITS
1,2,4-Trichlorobenzene (NIOSH RTECS No. DC2100000), CAS No. 0120-82-1 1,2,3-Trichlorobenzene (NIOSH RTECS No. DC2095000), CAS No. 0087-61-6 1,3,5-Trichlorobenzene (NIOSH RTECS No. DC2100100), CAS No. 0108-70-3 Trichlorobenzenes Mixture (NIOSH RTECS No. DC2090000), CAS No. 12002-48-1	Ca 100*	OSHA PEL Ceiling: 5 ppm, 40 mg/m³ ACGIH TLV, 1988-89 TLV-Ceiling: 5 ppm, 40 mg/m³
*Consult with your supplier for the technical specifications of your purchased product; the two other isomers listed are likely contaminants. **See NIOSH, RTECS, for additional data with references to reproductive, mutagenic, and irritative effects.		Toxicity Data** Rat, Oral, LD ₂₀ : 756 mg/kg Mouse, Oral, LD ₂₀ : 766 mg/kg

SECTION 3. PHYSICAL DATA

Boiling Point: 415°F (213°C) Melting Point: 63°F (17°C) Vapor Density (Air = 1): 6+ Molecular Weight: 181 Grams/Mole Solubility in Water (%): Insoluble

Specific Gravity (H,O = 1): 1.4634 at 77°F (25°C)

Appearance and Odor: A clear, colorless, combustible, stable liquid; characteristic, aromatic odor similar to o-dichlorobenzene.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point: 224.6°F (107°C) Autoignition Temperature: 1060°F (571°C)

LEL: 2.5% v/v* UEL: 6.6% v/v*

Extinguishing Media: 1,2,4-Trichlorobenzene is a slight fire and explosion hazard when heated. Use foam, dry chemical, water spray, or carbon dioxide to extinguish fires. Water may be used to blanket the fire if applied gently to prevent scattering; water spray can also be used to cool fire-exposed containers. If it is safe to do so, remove uninvolved containers of trichlorobenzene from the fire area. Unusual Fire or Explosion Hazards: Trichlorobenzene vapor is heavier than air and may travel a considerable distance to a low-lying source of ignition and flash back to its origin. During fires this material can thermally and oxidatively decompose to produce phosgene, hydrogen chloride, carbon monoxide, and additional toxic gases. Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

*Measured at 302°F (150°C).

SECTION 5. REACTIVITY DATA

Stability/Polymerization: Trichlorobenzene is stable in closed containers during routine operations. Hazardous polymerization cannot occur. Chemical Incompatibilities: This stable material is not expected to react with any commonly used industrial materials except under extreme conditions. Conditions to Avoid: Prevent exposure to sources of ignition such as sparks, open flame, lighted tobacco products, or electric arcs. Hazardous Products of Decomposition: This material will decompose thermally above 575°F (302°C). Contact with an open flame or an electric arc can produce very toxic gases such as phosgene and hydrogen chloride (see Genium Industrial MSDSs 66 and 30).

SECTION 6. HEALTH HAZARD INFORMATION

Carcinogenicity: 1,2,4-Trichlorobenzene is not listed as a carcinogen by the NTP, IARC, or OSHA.

Summary of Risks: The available data does not indicate high systemic toxicity for trichlorobenzene. Excessive inhalation of trichlorobenzene vapor is moderately irritating to the eyes and mucous membranes. Accidental ingestion of a few ounces could prove fatal. Irritation is likely to develop if this liquid should contact the skin or eyes. Trichlorobenzene acts as a defatting agent on the skin; chronic, repeated, or prolonged exposure can cause dermatitis. Medical Conditions Aggravated by Long-Term Exposure: Ailments of the blood, liver, kidneys; respiratory disorders such as asthma. Target Organs: Skin, eyes, and the mucous membranes of the respiratory system. Primary Entry: Inhalation, skin contact. Acute Effects: Irritation of the skin, eyes, and respiratory system; drowsiness, uncoordination, narcosis, and liver damage. Levels over 5 ppm will cause severe eye irritation, tremors, weight loss, headache, nervousness, restlessness, and increased heart rate and blood pressure. Chronic Effects: Chronic overexposure may result in liver, kidney, and lung damage. (This conclusion is based on the results of toxicity testing with experimental animals.) FIRST AID: Eyes. Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. Skin. Remove all contaminated clothing. Rinse the

SECTION 6. HEALTH HAZARD INFORMATION, cont.

affected area with flooding amounts ofwater, then wash it with soap and water for at least 5 minutes. Inhalation. Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have qualified medical personnel administer oxygen as required.* Ingestion. Unlikely. Should this type of exposure occur, give the exposed person 2 to 3 glasses of milk or water to drink and induce vomiting. Never give anything by mouth to someone who is unconscious or convulsing.* A dose of 2 ounces of this material may cause liver damage and death. Get medical help (in plant, paramedic, community) for all exposures. Seek prompt medical assistance for further treatment, observation, and support after first aid. *Note to Physician: Do not give adrenalin to victims of inhalation or ingestion.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Split/Leak: Notify safety personnel, evacuate unnecessary personnel, eliminate all sources of ignition and electric arcs, and provide adequate ventilation. Cleanup personnel need protection against skin or eye contact with this liquid as well as inhalation of its vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways. Waste Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Dissolve the trichlorobenzene in a suitable combustible solvent. Scatter the spray of this solution into a properly regulated furnace with an up-to-date permit(s) that is equipped with an afterburner and an alkali scrubber. Follow Federal, state, and local regulations.

OSHA Designations

Listed as an Air Contaminant (29 CFR 1910.1000 Subpart Z).

EPA Designations (40 CFR 302.4), Specific to 1,2,4-Trichlorobenzene

CERCLA Hazardous Substance, Reportable Quantity: 100 lbs (45.4 kg), per the Clean Water Act (CWA), § 307 (a).

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). Respirator: Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine operations (spills or cleaning reactor vessels and storage tanks), wear an SCBA. Warning: Air-purifying respirators will not protect workers in oxygen-deficient atmospheres. Wear a respirator that is approved by NIOSH to protect against trichlorobenzene vapor, especially when ventilation systems are not able to keep airborne concentrations of this material below the OSHA PEL cited in section 2. Other: Wear impervious gloves, boots, aprons, and gauntlets, etc., to prevent prolonged or repeated skin contact with this material. Suggested materials include rubber, neoprene, and vinyl. Ventilation: Install and operate general and local maximum, explosionproof ventilation systems powerful enough to maintain airborne levels of this material below the OSHA PEL cited in section 2. Local exhaust ventilation is preferred because it prevents dispersion of the contaminant into the general work area by eliminating it at its source. Consult the latest edition of Genium reference 103 for detailed recommendations. Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work areas. Contaminated Equipment: Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do not wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from your shoes and equipment. Comments: Practice good personal hygiene; always wash thoroughly after using this material and before eating, drinking, smoking, using the toilet, or applying cosmetics. Keep it off your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do not eat, drink, or smoke in any work area. Do not inhale TCB vapor.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store 1,2,4-trichlorobenzene in closed containers in a cool, dry, well-ventilated area away from sources of ignition and electric arcs in temperatures above 40°F (4°C). Special Handling/Storage: Prevent freezing of this material by installing appropriate heating elements in storage areas. If freezing should occur accidentally, place the trichlorobenzene in a warm room to thaw. Do not thaw it at high temperatures. Engineering Controls: Make sure all engineering systems (production, transportation) are of maximum, explosion-proof design. To prevent static sparks, ground and bond all containers, pipelines, etc., used in shipping, transferring, reacting, production, and sampling operations. Electric arcs must not be produced by any processing equipment. Other: Avoid breathing TCB vapor, especially any vapor from heated TCB. Dike fixed storage tanks and provide drainage to holding areas for high-density material.

Hazardous Materials Table (49 CFR 172.101): Not Listed Optional Hazardous Materials Table (49 CFR 172.102)

IMO ID No. UN2831

IMO Shipping Name: Trichlorobenzene, Liquid

IMO Hazard Class: 6.1

IMO Label: Saint Andrew's Cross (X)*

IMDG Packaging Group: III

*Harmful-Stow away from Foodstuffs.

References: 1, 8, 84-94, 116, 117, 120, 121.

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Prepared by PJ Igoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: W Silverman, MD

17

MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION





MSDS # _____150 LEAD CHLORIDE

Issued: September, 1985

Revised:

From Genium's MSDS Collection, to be used as a reference.

SECTION 1. MATERIAL IDENTIFICATION

MATERIAL NAME: LEAD CHLORIDE

OTHER DESIGNATIONS: Lead (II) Chloride; Lead Dichloride; Plumbous Chloride; PbCl2; CAS #7758-95-4.

SUPPLIER: Available from several suppliers including:

J.T. Baker Chemical Co.

222 Red School Lane

Phillipsburg, NJ 08865 (201) 867-2151

Fisher Scientific Company

Chemical Manufacturing Div. PO Box 375, 1 Reagent Lane

Fair Lawn, NJ 07410

Lead Chloride, PbCl ₂ >9 * Current (1985-86) ACGIH TLV, as Pb * Current OSHA PEL (as Pb) with an action level of 0.03 mg/m ³ (29 CFR 1910.1025).	ACGIH TLV:* 8 hr. TWA: 0.15 mg/m ³
** Current OSHA PEL (as Pb) with an action level of 0.03 mg/m ³	
	OSHA PEL** 8 hr TWA: 0.05 mg/m ³
(25 CFK 1910.1025).	Oral, guinea pig LDLo: 1500 mg/kg

SECTION 3. PHYSICAL DATA

Melting point 501°C Boiling point # 1 atm ... 950°C

Specific gravity 5.85

Solubility in water, g/100cc:

₽ 20°C 0.99 **●** 100°C 3.34

Molecular weight 278.10

APPEARANCE & ODOR: White crystalline powder. No odor.

SECTION 4. FIRE AND EXP	LOSION DATA		Lower	Upper
Flash Point and Method	Autoignition Temp.	Flammability Limits in Air		
N/A	N/A	N/A		

EXTINGUISHING AGENTS: This material is not combustible. Use extinguishing agents that are suitable for the surrounding fire. Minimize the spread of lead contamination.

Toxic fumes may be emitted under fire conditions. Firefighters should wear self-contained breathing apparatus and full protective gear to prevent inhalation and contact with dust, mist, and fumes.

SECTION 5. REACTIVITY DATA

This material is stable at room temperature under normal conditions of use and handling. It does not polymerize.

Lead chloride is soluble in water, hydrochloric acid, solutions of ammonium chloride and alkali hydroxides. On heating in air or oxygen, lead oxychlorides are formed. Toxic fumes may be emitted on heating. An explosive reaction can occur when lead chloride is heated with calcium.

SECTION 6. HEALTH HAZARD INFORMATION

TLV See Section 2

Lead chloride is toxic on inhalation and ingestion. It is a cumulative poison. The chief effects of excessive lead intake are anemia, neuological disorders and kidney damage. Symptoms of the neurological effects may include irritability, headaches, insomnia, delirium, convulsions, muscular tremors and palsy of the extremities. Excessive lead exposure may also have adverse effects on human reproduction. Symptoms of acute lead poisoning by ingestion include headache, abdominal pain, nausea, vomiting, diarrhea, and in severe cases, coma and death.

FIRST AID: Any worker who experiences symptoms of lead poisoning should be removed from exposure and receive prompt medical care.

EYE CONTACT: Flush eyes, including under eyelids, with running water for at least 15 minutes. Obtain medical attention.

SKIN CONTACT: Flush affected area with plenty of water. If irritation develops, seek medical attention.

INHALATION: Remove person from exposure. Keep them warm and at rest and get medical help promptly.

INGESTION: If person is conscious, give them plenty of milk or water to drink. Induce vomiting. Keep person warm and at rest. Get immediate medical assistance.

GET MEDICAL ATTENTION = Paramedic, In-plant, community.

SECTION 7. SPILL, LEAK AND DISPOSAL PROCEDURES

Notify safety/environmental personnel of large spills. Ventilate spill area. Clean-up personnel should wear respiratory protection, gloves and protective clothing. Carefully vacuum up spilled material. Place collected material in a suitable container that can be tightly sealed for reclaim or disposal (damp or wet clean-up can be used where more effective than vacuuming). Avoid dusting conditions at all stages of handling.

DISPOSAL: Salvage material when possible. PbCl₂ requires disposal as a hazardous waste. Contact a licensed chemical waste disposal contractor for treatment, packaging and disposal requirements. Follow Local, State and Federal regulations.

EPA HAZARDOUS WASTE NUMBER: D008 (EP Toxicity; 40 CFR 261.24).

REPORTABLE SPILL QUANTITY: 50001bs/2270kg (40 CFR 117.3).

SECTION 8. SPECIAL PROTECTION INFORMATION

Provide local exhaust ventilation to meet PEL requirements. NIOSH-approved respirators should be worn where engineering controls and work practices controls do not reduce exposures to at or below the PEL. Half-mask air purifying respirators with high efficiency filters are acceptable for concentrations up to 0.5 mg/m (2.5 mg/m with full facepiece). Protective clothing and equipment such as coveralls, gloves, hats, shoes should be worn when exposures exceed the PEL or where the possibility of skin and eye contact exist. Provide clean, body-covering work clothing weekly to workers exposed above the PEL (daily if exposed above 0.2 mg/m) and arrange for special handling and laundering of contaminated clothing. Change rooms (with separate storage facilities for street and work clothing) and showers are required for employees exposed above the PEL. Prevent dust from being transported to lunch room via the ventilation system or contaminated clothing. Consult OSHA lead standard (29 CFR 1910.1025) for detailed requirements. Eyewash stations and safety showers should be readily accessible.

Contact lenses pose a special hazard; soft lenses may absorb and all lenses concentrate irritants.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Store in tightly closed containers. Protect containers from physical damage. Use good housekeeping procedures (vacuuming and/or wet clean-up) to prevent accumulation of dust. Do not use compressed air for cleaning surfaces. Follow good personal hygiene practice: Wash face and hands thoroughly before eating, drinking or smoking. Do not eat, drink or use tobacco in areas of use.

Exposure monitoring, biological monitoring and medical surveillance should be provided in accordance with the OSHA lead standard (29 CFR 1910.1025) where applicable.

Prevent dust generation. Use with adequate ventilation. Avoid inhalation and contact. DO NOT INGEST!!!!

DOT CLASSIFICATION: ORMB (49 CFR 172.101)

DOT ID NUMBER: NA 2291

DATA SOURCE(S) CODE (See Glossary) 2, 4, 12, 14, 25, 55-58.V.

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AD Accrosco 11/85

INDUST. HYGIENE/SAFETY

MEDICAL REVIEW:

Du 85

3 4 00681 **Woodward-Clyde Consultants**

ATTACHMENTS

3 4 00602

ATTACHMENT 1 Woodward-Clyde Consultants

SITE SAFETY MEETING REPORT FORM

Project Number and Name:	Location	on:
Date and Time:	Activity:	
Site Supervisor:	Site Health & Safety Offi	сег:
EMERGENCY INFORMATIO	<u>N</u>	
Hospital:	Location	Phone
Fire Department:	Location	Phone
Police:	Location	Phone
Ambulance:	Location	Phone
ITEMS DISCUSSED:		
		
		
ATTENDEES:		
NAME (PRINTED)	SIGNATUR	E DATE

		——————————————————————————————————————
	•	
		

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3 4 00683

ATTACHMENT 2

SITE SAFETY OFFICER PRE-WORK CHECKLIST

1.	and a	you distributed the project Health and Salety Fian to an covered employees llowed adequate time for review and clarification or resolution of concerns? esNo		
2.		Are topics and issues discussed at the pre-work safety meeting documented in the project log book or on a safety meeting worksheet?YesNo		
3.	Have medical approval sheets, proper training documentation, and fit testing records for all covered employees been collected and filed at the jobsite? YesNo			
4.	Have the Safety Plan Compliance Agreement Forms been signed by all covered employees, collected, and forwarded to the business unit health and safety officer for filing?YesNo			
5.	Is all required personnel protective equipment (PPE) available in adequate supply on site? Yes No			
6.	A)	Is all required air monitoring equipment available in proper operating condition on site?YesNo		
	B)	Is calibration gas for all air monitoring equipment available in adequate supply on site?YesNo		
	C)	Is all air monitoring equipment properly calibrated and ready for use? YesNo		
7.		Are emergency service telephone numbers posted on site or readily available in the event of an emergency?YesNo		
8.	Is the emergency evacuation map posted on site or readily available if the need for site evacuation develops?YesNoN/A			

WC HEALTH AND SAFETY INCIDENT REPORT

Project Name:	TYPE OF INCIDENT (Check all applicable items)				
Project Number:	☐ Illness	☐ Fire, explosion, flash			
Date of Incident:	☐ Injury	☐ Unexpected exposure			
Time of Incident:	☐ Property Damage	☐ Vehicular Accident			
Location:	☐ Health & Safety Infraction				
	Other (describe)				
PROJECT NAME:		Identific in dividuals Zacoto and			
DESCRIPTION OF INCIDENT (describe what happened and possible cause. Identify individuals involved, witnesses, and their affiliations; and describe emergency or corrective action taken.)					
Reporter: Print Name	Signature	Date			
Reporter must deliver this report to the Operating Unit Health & Safety Officer within 24 hours of the reported incident for medical treatment cases and within five days for other incidents.					
Reviewed by: Operating Unit Health & Safety C	Offlicer Date	·			
Distribution:	mtor	•			
 Corporate Health and Safety Administr Corporate Health and Safety Officer Project Manager 	BLOI				
Personnel Office (medical treatment co	ases only)				

ATTACHMENT 4

Directions to Springhill Memorial Hospital are as follows:

- Leave site going South on I-43 to I-65 South.
- Take Dauphin Street Exit to the Stop Sign.
- Turn right, go past Dauphin Church and Hospital is on the left.

EMERGENCY PHONE LIST

This list of emergency services must either be posted on site or carried by all personnel:

Emergency Service	Location	Telephone Number
Any onsite emergency	Onsite - Olin	Extension 222
Emergency Response	Onsite - Olin	Extension 222
Nurse	Onsite - Olin	Extension 222
Safety	Onsite - Olin	Extension 209
Onsite Ambulance	Onsite - Olin	Extension 222
Security	Onsite - Olin	Extension 260
Fire, Police, Ambulance	Washington County	
	Volunteer	(205) 944-2973
Hospital	Springhill Memorial	(205) 460-5315
Infirmary	Washington County	
	Infirmary Hospital	(205) 847-2223
Emergency Helicopter	South Flight Helicopter	1-800-USA-5151
Haz-Mat:Service	Alabama Haz-Mat	
	Response	(205) 438-7230
Poison Control Center	Lafayette, LA	(318) 325-6454
WCC Physician	Baton Rouge, LA	(504) 275-7770

ATTACHMENT 4 (Continued)

Illness, injuries, and accidents occurring must be attended to immediately in the following manner:

- Remove the injured or exposed person(s) from immediate danger.
- Render FIRST AID if necessary. Decontaminate affected personnel, if necessary.
- Report the accident to the Health and Safety Officer immediately. Form HS-502 must be completed within 24 hours of any accident and forwarded to the Corporate Health and Safety Officer (see Attachment 3).
- Develop procedures, in accordance with the Health and Safety Officer, Site Safety Officer, and Project Manager to prevent a recurrence.